

- 8 - PS455

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The Institute of Chartered Accountants in England and Wales

Incorporated by Royal Charter, 11 May 1880

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ISSN 0001-4788



Accounting and Business Research

Volume 18 Number 70 Spring 1988

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Microfilmed copies of back numbers are available from Microfilm Ltd., East Ardsley, Wakefield, West Yorkshire WF3 2AT, England.

Subscription Rates

	UK	Overseas	Overseas Airmail
Individual	£22	£24	£29
Student	£11	£12	£17
Corporate/Institutional	£32	£33	£38

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Professor William Baxter

In October 1947, William Baxter became the first full-time Professor of Accounting at the London School of Economics and Political Science. Forty years later, on 9 March 1988, nearly 200 of Baxter's students, colleagues and friends gathered at LSE to hear a series of lectures on two topics to which Baxter and his LSE colleagues have made noteworthy contributions: price change accounting and opportunity costs. The lectures were organised by the School's Department of Accounting and Finance, and were sponsored by accounting firms Arthur Andersen & Co. and Arthur Young.

Professor Geoffrey Whittington of Bristol University, in the opening lecture, pointed out how the financial statements of businesses prepared using the traditional historical cost method of accounting become misleading in times of changing prices. The debate over price change accounting originated in the USA and Europe early this century. The British contribution to the debate could be traced to the group of scholars at LSE in the 1930s associated with Arnold Plant, particularly George Thirlby, Ronald Coase and Ronald Edwards, whose 1938 series of articles 'The Nature and Measurement of Income' had a significant influence on Baxter. Following his appointment at LSE, Baxter wrote extensively on price change accounting, and his views reflect a gradual move away from a general price level adjustment approach to one that reflects both the specific prices of business assets (using the 'Value to the Owner' concept) and general price change, a system presented most elegantly in Baxter's 1975 book *Accounting Values and Inflation*.

Baxter's original accounting colleagues at LSE, David Solomons and Harold Edey, have themselves made important contributions, Solomons through his work on the relationship between accounting and economic concepts of income and Edey through his membership of the Accounting Standards Steering Committee and the Inflation Accounting Steering Group in the 1970s, where he was able to influence the British accounting profession's attempts to introduce a practical form of price change accounting.

The influence of Baxter and LSE is not limited to the United Kingdom, as Professor Harry Evans of the University of Pittsburgh pointed out in his lecture. Much of the theoretical writing on price change accounting that appeared in the United States during the 1960s and 1970s owes an intellectual (and often a personal) debt to Baxter. On a more practical level, Baxter's colleague Bryan Carsberg played a crucial role in the development of the US Financial Accounting Standards Board's major standard on price change accounting (FAS 33).

Baxter's contribution to the LSE opportunity cost tradition is perhaps less pervasive, but, as Professor Don Lavoie of George Mason University outlined, this was another area where Arnold Plant and his associates brought economic analysis to bear on practical business problems. The role of George Thirlby, acknowledged by Baxter as one of his mentors, was particularly significant in developing the opportunity cost concept. David Solomons drew the series of lectures to a close by expressing mild scepticism as to whether the writings on opportunity cost of Thirlby and his colleagues really amounted to a 'tradition.'

At a dinner in the evening of 9 March, Sir John Sparrow (Vice-Chairman of the LSE Court of Governors) paid tribute to Baxter's influence, as a teacher and writer, on forty years of British accounting. Pointing to the representatives of the accountancy profession, the business and financial world and academe present to honour Baxter, Sir John summed up Baxter's contribution: 'If you seek his monument, look around you.'

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The Impact of Search Costs and Asymmetric Information on Current Value Accounting

R. K. Ashton

Abstract—This paper examines the impact that search costs and asymmetric information would have on financial statements if either of the two main systems of current value accounting were introduced. The significance of search costs is that, although the models which determine the optimal amount of search are becoming more general, they are based on very restrictive assumptions and are of limited practical application. In relation to the second issue, where asset markets are dominated by asymmetric information, the 'signal' conveyed by the accounts would be misleading. It is argued that, whilst these two issues can more easily be resolved where the provision of financial information is unregulated, they are likely to be important considerations in the political process which results in an accounting standard.

Introduction

There is an extensive literature¹ on the merits and demerits of the two main systems of current value accounting, some of which has been concerned with why one system should be adopted in preference to the other. For instance, Edwards and Bell (1961) justify entry values by arguing that current operating profit is a good indicator of long-run profitability, whereas Chambers (1966) argues in favour of exit values on the basis that market agents need information about the capacity of an entity to adapt to a changing economic environment. The implementation problems of both systems have, by comparison, received less attention. The significance of this issue is that it affects the quality of the 'signal' provided by the two systems of accounting and, as a corollary, the allocation of resources both across firms and to individual firms over time. In this context, the quality of the signal is a function of two main factors: (i) the level at which assets (and to some extent liabilities) are aggregated—the so-called aggregation problem; and (ii) the importance of price dispersion in individual asset markets.

The first problem is mainly an identification issue which has been the subject of considerable scrutiny in the literature (see for instance the classic discussion by Thomas, 1974). In this paper, no further reference will be made to it except to note that it has important implications for the quality of the signal that will be transmitted.

The second issue (price dispersion) has been

discussed mainly in the context of exit value accounting (or, as it has been called, CoCoA). For instance, Chambers (1966, p. 243) suggests that the mean or modal value should be reported where there is a well developed market for an asset, e.g. the market for many inventories. Ma (1974) has pointed out that the most difficult valuation issues would arise where the assets were either sparsely traded or where there is only a market price for a similar, but not identical, asset. One interesting point raised in his paper is the suggestion that a dispersion measure should also be reported for each asset, together with the average number of observations per item and the sources from which observations have been drawn where this information is material, i.e. where the value placed on an asset is relatively large and/or where the number of observations has been taken from relatively few sources.

This aspect of the debate has to some extent been eschewed in the entry value literature. Where a suitable market value (a concept left ill-defined) is not available, index numbers are recommended (see, for instance, Edwards and Bell, 1961, pp. 185-188). As these are widely regarded as broad averages it might be argued that they also satisfy Chambers' proposal that a measure of central tendency should be reported, although it might also be useful to know the degree of dispersion associated with individual indices.

This paper will examine the problems of implementing these two systems of current value accounting in more detail by reference to the literature on the economics of information. Two main issues will be addressed: (i) the impact of search costs where there is dispersion in prices quoted for an asset; and (ii) the effect asymmetric information

¹See Peasnell and Skerratt (1976, pp. 8-13 and 66-67) for a brief discussion of some of the issues raised by this literature in a current value context.

Table 1**Expected quoted prices based on a sample N , distributed uniformly over the range 0–1**

N	1	2	3	4	5	6	7	8	9	10	11
$Ep(n)$	0.5	0.33	0.25	0.2	0.16	0.143	0.125	0.1	0.1	0.09	0.083

has on the prices quoted for assets whose quality cannot be determined until after they have been purchased, and by corollary on the quality of the 'signal' reported in the accounts. The next two sections will summarise the main developments in this area. However, it should be appreciated that there is now a large volume of literature on this subject, and what follows is only a brief summary. The following section will discuss the implications for current value accounting, and the final section will present some conclusions.

Early developments in the search literature²

In order to introduce the pedagogy of the subject it is first necessary briefly to examine the case where search costs are predetermined. This case is closely associated with the seminal discussion by Stigler (1961), who posed the question: 'What is the optimal number of shops a consumer should visit before purchasing a good?'. Clearly the answer will involve a trade-off between cost savings (as a result of finding lower prices) and increased search costs.³ In what follows the latter will be defined as c , which for simplicity will be assumed to be constant. Stigler analysed the problem by assuming that the consumer knew the underlying probability distribution of prices (i.e. the probability of being quoted a particular price) but not which outlets charged the highest and lowest prices. The problem facing the consumer was therefore to minimise the following equation:

$$TC = Ep(n) + cN \quad (1)$$

where:

$Ep(n)$ = Expected purchase price (the price quoted multiplied by the probability of being quoted that price),

N = Number of quotes obtained, and

TC = Total cost of purchasing one unit

To solve equation (1) it is necessary to assume that the dispersion of prices follows a particular probability distribution whose statistical properties are well known. By assuming that prices are uniformly distributed (i.e. that there is an equal probability of

being quoted any one of the possible prices), three results were derived, of which the third is the most important for the purpose of this paper:

- (i) there are decreasing returns to search,
- (ii) as search costs fall the optimal sample size rises and total expected costs fall,
- (iii) the expected price can be derived by iteratively solving the formula:

$$Ep(n) = \frac{1}{N+1} \quad (2)$$

The implications of equation (2) for accounting can be illustrated by an example. Suppose the distribution of prices for a particular asset is known but not the particular outlet charging the minimum price.⁴

If it is assumed that the distribution of prices follows a uniform distribution (following Stigler's analysis), $Ep(n)$ can be derived by substituting successive values of N in equation (2). The results, based on eleven iterations, are reported in Table 1.

The values of $Ep(n)$ can be inserted in Equation (1) to derive the optimal sample size N^* by using successive values of $Ep(n)$ as a proxy for $Ep(n^*)$. Table 2 below similarly gives results based on various iterations and different values for search costs.

The main limitation of this search procedure is that it assumes that an individual searches each of

Table 2

Total cost of purchasing one unit of a good (or asset) assuming the dispersion in prices is uniformly distributed over the range 0–1 and a search cost (c)

c	N^*	$Ep(n^*) + cN^*$
0.1	2	0.53
0.05	3 or 4	0.4
0.025	5	0.2916
0.01	9	0.19
0.001	31	0.06225

Source: adapted from Stigler (1961).

²For a comprehensive review of this topic, albeit a little dated, see Hey (1979, chapters 4, 5, 6 and 7).

³This would be made up of all costs associated with the search, such as telephone and labour time.

⁴The analysis is identical where the maximum price is required. To test whether a solution to equation (1) was either a maximum or a minimum it would be necessary to take second order conditions.

the N^* outlets and is not affected by the quotations obtained during the search. It follows that he continues to search even if he finds an outlet that quotes the minimum price and, by implication, even if the potential gain from continuing to search is less than the incremental cost that will be incurred in searching the remaining N^* outlets. If the cost of each quote is known, it would be a better strategy to examine each in turn and decide whether it is worth continuing the search. At some point a rational purchaser will decide whether it is better to accept the lowest price (R) quoted so far or to search one more shop and hope to buy at the lowest price. The process of sequential searching thus involves a trade-off between search costs (c) and the expected gains (g) from searching one more outlet. This in turn necessitates comparing the lowest price to date with the expected price that will be quoted if one more outlet is searched (the probability that the next quote will be lower than the minimum price quoted to date multiplied by the price quoted). This trade-off can be stated more formally as follows:

$$g - c > 0 \quad (3)$$

A solution to this equation can be found if an expression for the distribution of quoted prices is known. In fact, where the distribution is known, equation (3) can be recast as follows:

$$\int_P^{R^*} F(p) dp - c = 0 \quad (4)$$

The function $F(p)$ defines the area under the probability distribution (the cumulative probability) between the price (R) that will be observed if one more outlet is searched and the minimum price (p) that has been observed so far (the gain from searching one more outlet). The price which satisfies equation (4) is known as the reservation price (R^*) and at this point the consumer is indifferent between searching and stopping. (For a formal mathematical proof, see Hey, 1981, pp. 87-90.)

The sequential analysis, by explicitly recognising this trade-off, is obviously of more practical relevance. However, it should be stressed that the general applicability of both cases is very limited as the models assume that the underlying distribution of prices is both known and follows a statistical distribution whose properties are well defined. In practice it is highly unlikely that either will be known or remain constant over time. This comment is also germane to the assumption that the minimum (or, for that matter, the maximum) price is known but not the outlet charging the lowest (highest) price.

The above analysis has a number of important implications for current value accounting reports:

1. In the real world, irrespective of which variant

of current value accounting is reported, there will be dispersion in quoted prices for individual asset categories commonly reported in the balance sheet (and also liabilities such as provisions and listed debt). This raises the question of whether the maximum, minimum or average value should be reported. The problems that this might cause can be illustrated by considering the reporting of exit values. Should it be assumed that the assets would be sold to the highest bidder, or instead to a third party wanting to minimise his investment outlay? As the objective of exit value accounting is to measure the capacity of a business to adapt, the most logical would be the former value, although it must be conceded that this would almost certainly violate the accountant's doctrine of conservatism. Reporting the mean or median value (following the suggestion of Chambers, 1966, p. 243) might be more consistent with this doctrine and also, arguably, the objectivity requirement which underlies much of accounting practice. A similar line of argument could of course be put forward for reporting minimum cost in the case of entry value accounting. Assuming these issues could be resolved, there would however still remain the problem of how search costs should be reflected in the valuation process.

2. The degree of dispersion in prices will be a function of how efficiently the particular asset market reflects information about the asset's earnings stream in quoted prices and the degree of competition in the market for the asset. Where the market is both efficient (in an information sense) and competitive, the dispersion will be small and reflect temporary disequilibrium factors, such as arbitraging. As search costs will not be the same for each agent (since there are almost certainly economies of scale in collecting information about prices), the spread of quoted prices will be different. Consequently the value attributed to an asset is likely to reflect (at least in part) the purchasing requirements of an agent. It is therefore conceivable that each agent in an industry might report a different price for an identical asset. As a result the 'signal' in the values reported for individual assets might contain a significant 'noise' factor and, in extreme cases, reported values might be poor proxies for an asset's intrinsic value. In these circumstances a more reliable indicator might be an industry average based on the mean (or median) price quoted to each agent in the industry (the appropriate measure of central tendency would be a function of the underlying price distribution). Where search costs are high (possibly as a result of thin trading in the asset), a sufficiently broad indicator might be an industry specific index number.

3. It has been put to the writer that numbers in financial statements must be verifiable and in the context of current value accounting average values

should be reported.⁵ The basis for this assertion is that modal averages are readily verifiable (assuming away the possibility of multi-modal distributions) and that the main problem for the reporting accountant in this context is the size of sample used to compute the measure of central tendency. In terms of the above analysis the minimum and maximum prices are also verifiable if the probability distribution which defines the dispersion in quoted prices is known—and this is so irrespective of whether entry or exit values are being considered. Reporting the mean value is also not without problems. Inherent in this suggestion is the assumption that the prices quoted for an asset are normally distributed and that, where the sample size used to compute the mean is small, the sampling distribution of the mean follows a 't' distribution.⁶ Where the sample size is large the assumption of normality is usually justified by reference to the law of large numbers (Spiegel, 1972) but in this case it would also be legitimate to work with the uniform distribution. Indeed the latter distribution makes fewer assumptions than the normal distribution and has frequently been employed in the search literature. As the former distribution is less restrictive, more general results can be derived.⁷ The mode and median suffer from the disadvantage that very little statistical theory has been developed around these concepts. In terms of the implications for this paper the trend in the search literature has been to develop optimal stopping rules in an increasingly general framework (see the discussion below). It follows that minimum and maximum prices can be verified without having to make recourse to statistical theory based on very restrictive assumptions.

4. The above analysis has assumed that the seller and buyer are risk neutral as defined by Rothschild and Stiglitz (1970 and 1971). Where this assumption is violated, these conclusions need to be modified. They show that, as the distribution of

prices becomes more risky,⁸ based on their definition, expected total costs decrease; that is, consumers prefer to sample from the riskier distributions! Whilst this result may seem odd at first sight, it becomes more understandable when it is realised that the searcher has a higher chance of discovering lower prices.

Recent developments in the theory of search

More recently it has been shown that the concept of a reservation price is of more general applicability and in particular that it is not necessary to make any assumptions about the underlying distribution of prices. For instance, Kohn and Shavell (1974) contrast the static case (with a known distribution) with the adaptive case (with an unknown distribution) and show, perhaps surprisingly, that the reservation price (and search cost) in the latter case is not substantially different from the former. The reason is that, in the adaptive case, one of the benefits of continued search is the acquisition of additional information about the distribution of prices.

Rothschild (1974) has shown that the reservation price property (and implications for search costs) can be derived by making only one important assumption—that the searcher's prior beliefs about the underlying price distribution can be approximated by a Bayesian distribution known as the Dirichlet distribution. The advantage of using Bayesian methodology is that it maximises all the information at the disposal of the searcher. The relevance of this assumption for the search literature is that, as the sample size increases, the reservation price is less influenced by the searcher's beliefs and increasingly determined by the results of the sample.

The importance of Rothschild's article is the level of generality at which the reservation price property is derived⁹ in contrast to the restrictive

⁸In summary these authors define risk in the following terms:

- (1) $Y = X$ plus noise.
- (2) Every risk averter prefers X to Y .
- (3) Y has more weight in the tails than X .
- (4) Y has greater variance than X .

Two variables are considered, X and Y , with the same means and with probability density functions (*pdfs*), $f(\cdot)$ and $g(\cdot)$ defined over (a, b) and cumulative distribution functions (*cdfs*) $F(\cdot)$ and $G(\cdot)$. They show that (1), (2) and (3) are equivalent to:

$$\int_{x=a}^y [F(x) - G(x)] dx > 0$$

for all Y in $[a, b]$ with equality holding at $y = b$. This equation only induces partial ordering of distributions; there are many pairs of distributions for which neither this equation nor its converse hold, and so the question which is more risky cannot always be resolved within their framework.

⁹See also Rosenfeld and Shapiro (1981) who use a Bayesian framework to derive formal search rules.

⁵I am grateful to one of the anonymous referees for drawing my attention to this point.

⁶For an exposition of these points see the standard classical statistical text (Kendall, Stuart and Ord, 1983).

⁷This principle of parsimony was first expounded by William of Ockham, see Lacey (1976):

assumption underlying the predetermined and sequential analysis discussed above. The importance of this development has been highlighted by Gastwirth (1976), who has shown that, if the wrong statistical distribution is chosen, there is a significant increase in search costs and in terms of the 'signal' the reservation price would, almost certainly, contain a large 'noise' factor.

The analysis to date has not taken into account another aspect that economists have only relatively recently started to study—quality. This gives rise to problems where buyers and sellers possess asymmetrical information and is found where goods have a degree of uniqueness. Akerlof (1970), in what has become a seminal article, analysed this problem by reference to the second-hand car market. The buyer, in this situation, is unable to ascertain the quality of the car prior to purchase and consequently, from the seller's point of view, there are potentially large gains to be made by concealing the car's true quality. Akerlof shows that this inability to discriminate between cars of different quality may lead to a breakdown in the market process even though a (non-degenerate) equilibrium price would exist in the absence of quality uncertainty. He attributes the causality to the average quality of cars offered for sale, which he argues is not exogenous and will also depend on price. Thus, as price falls, the quantity offered for sale will fall (and it follows, average quality) as owners of the 'good' cars withdraw them from the market. The fall in average quality of cars offered for sale will induce a further decline in price which in turn will result in a further deterioration in average quality. It is therefore conceivable that as price falls demand will fall. This will occur if the rate at which demand falls as a result of the decline in quality is greater than the rate at which demand increases as a result of the fall in price. If this process continued the market (in the limiting case) would eventually disappear, although it might subsequently re-appear if other 'signals' were provided by the suppliers of cars, e.g. guarantees and warranties.¹⁰

This possibility has important implications for current value accounting as at least two important fixed assets fall into this category—motor cars and some plant and machinery. It is clear that where the market for an asset is dominated by asymmetric information, the market price (irrespective of whether it is the buying or selling price) is unlikely to be a reliable indicator of either the entry cost to an industry or as a measure of the capacity of an agent to adapt. An alternative approach, albeit more subjective, would be to report the market price (irrespective of which variant) and also a 'signal' about the quality of the asset, e.g. a guarantee or warranty, along the lines suggested by

Spence (1973). The question would then arise as to whether this 'signal' should be reported and at what value. If it was reported it would almost certainly be very subjective and, in statistical terms, subject to a large standard error. This would violate one of the major claims made by proponents of exit value accounting: objectivity. Reporting might be justified on the grounds of relevance and that, where the two requirements conflict, relevance should be the overriding criterion. The reporting of this 'signal' could, perhaps, be more easily accommodated in entry value accounting as its proponents make less strident claims under this heading.

Subsequent papers (e.g. by Hey and McKenna, 1981; Wilde, 1981; and Schwartz and Wilde, 1985) have combined price and quality in their models. Whilst these refinements have obviously added to the notational complexity of the models, they are of limited applicability to accounting reports as they are confined to consumption goods. To be applicable to investment goods (fixed assets), it would be necessary to assume unchanging market conditions over substantial periods of time, a highly unrealistic assumption for most practical purposes. Nevertheless, the main finding of these more recent papers is that the conventional reservation price rule is optimal only in certain circumstances. In the general case, depending on the stochastic relationship between quality and price, strategies across the full spectrum are optimal in certain circumstances, e.g. buying at cheap, expensive, or intermediate prices.

These recent developments in the literature outlined above have important implications for the quality of 'signal' provided by both current value accounting systems. Whilst this is obvious where there is asymmetrical information and no equilibrium market clearing price, it can be argued that this is an extreme case, because of other 'signals' provided by suppliers of goods, such as warranties and guarantees. It might also be argued that it would only be a problem where the quality of an asset is subject to considerable variability. Unfortunately this does not avoid the more difficult and damaging issue that arises where both price and quality vary simultaneously. The optimal strategy is then a more complex issue, the analysis of which to date has been confined to consumption goods. It follows that, where there is both price dispersion and information asymmetry, it is not possible to prescribe general rules as to the value which should be reported in the financial accounts and by definition the amount of search costs that should be incurred in ascertaining that value. In the absence of general rules, the values placed on an individual asset would, almost certainly, contain a high degree of 'noise' and seriously undermine the quality of the 'signal'.

From this analysis it is clear that, whilst the case

¹⁰See the article by Spence (1973) for more on this issue.

for current value accounting might have considerable merit where quality is relatively homogeneous and the market is both highly developed and efficient, it is equally clear that where these factors are not present the 'signal' provided by either entry or exit based systems is likely to contain a high degree of 'noise'—ambiguous at best, confusing at worst. This suggests that future empirical research in this area should consider the extent to which these conditions obtain in the individual markets for assets which economists would broadly define as investment goods. If asymmetrical information dominated the markets for these goods, the case (at least in terms of the 'signal' provided by the accounts) for introducing some form of current value accounting would be weakened.

Implications for current value accounting

The above discussion has not related the problems of search costs and asymmetric information to another practical issue—the institutional financial reporting framework: that is, whether the reporting framework is prescribed by a regulatory authority or free market forces. Where there is an unfettered market, the optimal 'signalling' device (in terms of the financial information disclosed) will be supplied by the market.¹¹ The incentive to supply such 'signals' is based on the argument that, if the information does not satisfy this requirement, the agent's cost of capital will be higher and the price of the agent's shares will stand at a discount. The agent will therefore be vulnerable to a take-over bid¹² as production and investment decisions are unlikely to maximise the wealth of shareholders. To the extent that either or both CCA or CoCoA are perceived by users as optimal 'signalling' devices, whether for internal or external purposes, the issues raised in the previous paragraphs would be very relevant to those who prepare and attest accounts.

Where the market for an asset is efficient and competitively traded, the problems of which value to report (i.e. the maximum or minimum) could be resolved by the individual agents involved in the process of supplying and demanding financial information. They should therefore be more apparent than real. It is where these conditions are not satisfied that the problems would be more difficult to resolve, even in a market context. For instance, the market for many assets is sparsely traded or even non-existent where the asset falls into the non-vendible category, e.g. specialised fixed assets. Even where the market for an asset is relatively well developed, the impact of search costs might be difficult to resolve if the underlying statistical

distribution is not known (and in a practical context it is hardly realistic to assume that the distribution will be known), given the costly consequences associated with choosing the wrong distribution (Gastwirth, 1976). In these cases the most practical and robust (and indeed perhaps only) solution might be historic cost adjusted by an appropriate industry index number. The difficulties of identifying market values have already been considered in some detail. For instance both the Sandilands Report (1975, paragraph 572), and Statement of Standard Accounting Practice (SSAP) 16 (paragraphs 17–24) recommended, in the case of entry value accounting, extensive use of index numbers. Two reasons were advanced: the difficulty of obtaining a meaningful measure of replacement cost and the cost of obtaining such a measure (search costs). In practice, even in an unfettered financial reporting framework, it may therefore be necessary to use index numbers as a proxy for market value.

The importance of search costs and asymmetric information is less obvious where the financial reporting system is prescribed by a regulatory authority. In this case the reporting system is determined by 'political' factors, and issues such as asymmetric information and search costs are only one of the many factors which the regulatory authority takes into account in the political process. This is not to say that these factors are attributed little priority. As stated earlier, both the Sandilands Report and SSAP 16 considered the difficult implementation problems (and search costs in particular) of entry value accounting in some detail. Although both bodies recommended index numbers in preference to market values, SSAP 16 (which is even more assertive on this issue than Sandilands) prescribes the reporting of market values only in very narrowly defined circumstances. Indices also have the added advantage that they fit in well with practising accountants' notions of objectivity as they can be readily verified (although in practice assets owned by overseas companies can pose special problems). It follows that, where entry values are prescribed by a regulatory authority along the lines set out in SSAP 16, the economics of information literature is of limited relevance to the problems of identifying the appropriate current replacement cost, except in certain narrowly prescribed circumstances. However, it should be reiterated that search costs and the effect of asymmetric information might be (and indeed were) very important factors in the 'political' process and debate leading up to the setting of a current value accounting standard.

The difficulty of obtaining reliable market values, and selling prices in particular, might be sufficient grounds for a regulatory authority either specifically to reject exit value accounting or to

¹¹For more on this topic see Benston (1979/1980).

¹²For the classic argument along these lines see Manne (1965).

recommend a highly modified version based on the extensive use of indices. This may be necessary for one or more of the reasons that the use of market values has been rejected in the case of entry value accounting, e.g. the difficulty of identifying the appropriate market value where either a market does not exist (or is at least subject to infrequent trading) or the cost of obtaining a reliable estimate of market value is too high. On the other hand, a balance sheet based on indices might not provide a very good estimate of the capacity of a business to adapt, the very reason for implementing the system!

It follows that, where both entry and exit value systems of accounting are based on the use of indices, one system may be a good surrogate for the other. In practice this will depend on the extent to which the same (or similar) indices are used and on the importance of differences in the market values reported under both systems. Where similar indices are used and differences in the market values are small, the impact of applying either of the two value systems on the financial statements will be very similar. Where this is the case, differences in the two systems are likely to be more apparent than real. This conclusion may also be applicable where there is an unfettered market in the provision of financial information if it is necessary to make extensive use of indices as proxies for market values, and this may also be true where the market for the assets owned by a company is relatively efficient and competitive.

Conclusions

This paper has examined the literature on the economics of information in the context of implementing current value accounting. Two main problems have been addressed in this literature: the importance of search costs and the effect of asymmetric information on the functioning of markets. In terms of the financial reporting framework these two issues are more important where there is an unregulated market in the provision of financial information, and the optimal 'signalling' device, as determined by the market, is one (or possibly both) of the variants of current value accounting. It is of less importance where accounting information is viewed as a public good which cannot be privately appropriated and, as a consequence of market failure, has to be prescribed by a regulatory authority. In these circumstances search costs and the effect of asymmetric information are just two inputs in the political process which results in the promulgation of the accounting standard by the regulatory body. However, irrespective of whether the financial reporting framework is based on a free or regulated market, the models (and prescriptions) incorporating search costs are limited at

the moment by the very restrictive nature of the underlying assumptions, including risk neutrality, and perhaps most heroically of all, that the dispersion of prices follows one of the well known statistical distributions. This should not detract from the potentially valuable contribution that the literature on the economics of information makes to the debate, particularly regarding the importance of search costs and the quality of the 'signal' where asymmetric information is an important factor in the valuation process.

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Financial Accountability & Management

Autumn 1987

Editor: John Perrin

Vol. 3 No. 3

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Company Law Reform and the Board of Trade, 1929-1943

Paul Bircher*

Abstract—The accounting provisions of the Companies Act 1929 were very permissive. Through the 1930s and early 1940s a substantial volume of criticism was directed at these provisions and an active campaign for their reform was waged. Reform was only forthcoming, however, after 1945 under the influence of the report of the Cohen Company Law Amendment Committee. The government department responsible for managing the reform was the Board of Trade. The records of the Board of Trade reveal that through the 1930s there had been several internal inquiries into the need for reform of the law relating to accounting. None of these had led to any change. In late 1942, however, the Board of Trade initiated an inquiry into company law reform and a major part of the explanation for this initiative appears to lie in the change in attitudes towards the social obligations of companies that had been stimulated by the Second World War.

For more than thirty years, until the incorporation of the EEC 4th Directive into UK law with the enactment of the Companies Act 1981, the 1948 Companies Act (CA 48) was the principal expression of the law relating to financial accounting. Yet when CA 48 was introduced it represented a watershed or, as Edey (1950) puts it, 'a substantial stride forward in generally accepted accounting standards'. The minimalist accounting practices permitted and adopted under the Companies Act 1929 (CA 29) were substantially strengthened. CA 48 required disclosure and circulation of a more detailed profit and loss account to which the audit report was to apply, group accounts where relevant, detailed disclosure of assets and liabilities as specified in the 8th Schedule, and disclosure, among other things, of movements in the profit and loss account to and from reserves. All these requirements were new and significantly reduced the potential for abuse which had existed previously. They produced a very different set of accounting practices for all but those few companies already operating these 'best practices'. The change in accounting practice introduced by CA 48 is thus one of the milestones in the modern history of the development of financial accounting in the UK.

Yet despite the significance of the introduction of CA 48 for modern accounting history the story of its production is only very sparsely discussed in

the literature. Panitpakdi (1955) discusses the crisis in accounting that was caused by the Royal Mail case and charts some of the criticisms and the calls for company law reform—both related to accounting and otherwise—that appeared in the press and were voiced in Parliament. Similarly, Edwards (1979) considers the impact of the findings of the court in the Royal Mail case on accounting thought and practice. Other writers, such as Kitchen and Parker (1980), have noted further accounting events in the dozen years between the Royal Mail case and the establishment of the Cohen Committee, whose recommendations were enacted into the legislation that became CA 48. Zeff (1971) points to the establishment in 1936 of the Accounting Research Association at the LSE and to the research committee set up in 1935 by the Incorporated Accountants. In 1942 the Institute of Chartered Accountants in England and Wales (ICAEW) created their Taxation and Financial Relations Committee and began to issue Recommendations on Accounting Principles.

But such links as exist between these and other events and the eventual generation of the new accounting provisions of CA 48 have remained rather shrouded. CA 48 ushered in a new era of accounting practice yet it is not clear why the drastic revision of the accounting provisions of CA 29 actually took place at this time or in this form, or even at all.

There is however considerable evidence on the process of this change in accounting principles and practices. This is available in the Board of Trade records* for the period between 1st November 1929, when CA 29 became law, and the 26th June 1943, when the Cohen Committee was set up by Hugh Dalton, then President of the Board of Trade (BOT), to 'consider and report what major

*The author would like to thank his colleagues at the London School of Economics and Political Science and two anonymous referees for the many helpful comments and suggestions received. Sponsorship by the Institute of Chartered Accountants in England and Wales under a CATER Fellowship is also gratefully acknowledged.

*Public Record Office, Kew, Board of Trade papers, Index numbers BT58/BT146.

amendments are desirable in the Companies Act 1929...'. The BOT was the predecessor of the Department of Trade and Industry with responsibility for company affairs and for assessing the need for a review of the company law. The records of the BOT, which are available at the Public Record Office, Kew, provide detailed documentation of the problems noted with the company law, accounting problems among them. They also contain documentation of the diversity of attitude towards these problems, and assessments of their significance and of the BOT's recommendations and justifications. These previously unexplored records therefore help to throw considerable light on the events that led to the eventual revision of the law relating to accounting and thus to the significant changes in the practice of accounting that CA 48 called for.

These records are particularly valuable to a history of the accounting changes introduced by CA 48 because of the dominant role that the BOT played in the change. The BOT was responsible for actually initiating and managing change in the legal framework of accounting. Their records thus provide a unique insight into the processes which lie behind a major change in accounting and the way in which it is regulated by law. They provide an opportunity to understand in an unusually immediate manner the origins of the introduction of a major and contemporary piece of accounting legislation.

The early years

The possibility of a reform of company law is raised in the BOT records only one year after the introduction of CA 29. A. M. Samuel, a Conservative MP, chairman of the Public Accounts Committee in the House of Commons (HOC) and formerly financial secretary to the Treasury, asked both in Parliament and in the columns of *The Accountant* whether the President of the BOT (then William Graham of Ramsay Macdonald's Labour Government) would introduce proposals for company law reform and made many specific suggestions for that reform. *The Accountant* leader comments on these proposals that:

there is not one . . . of which the desirability has not been abundantly proved by the events of the past two or three years. Mr Samuel's proposals can broadly be divided into two categories, those relating to accounting and those dealing with responsibility of directors. (*The Accountant*, 13 December 1930)

As a result of this call the President of the BOT invited auditors, accountants and other responsible persons to send him suggestions for amending the company law. Files were opened

within the BOT of those suggestions, catalogued by subject area—accounts, directors, windings-up, etc. A file of press cuttings that related to proposed amendments or comments on company law was also opened. Company law amendment thus was on the agenda only one year after the introduction of CA 29 and even before the Royal Mail case came to court.

The Royal Mail case closed at the end of July 1931 and during the latter months of 1931 the BOT press cuttings reveal a flurry of comment on accounting and company law amendment. Among these a cutting from *The Financial Times* of 5 November 1931 reports that:

Mr Adam Maitland, Conservative MP for Faversham, who is a retired accountant, will urge the President of the BOT to introduce a Government Bill into the House as soon as Parliamentary business gets underway. 'The present position of accountants in the light of the RMSP prosecution is impossible' Mr Maitland said.

Consequently, Sir Charles Hipwood, then Second Secretary at the BOT, suggested to the Companies Department of the BOT that the comments that had been received might be reviewed and a memorandum on the subject of company law reform prepared. This document was drafted by 31 December 1931 and finalised by 10 February 1932. Just over two years after the introduction of CA 29 the BOT conducted its first formal internal review of the operation of the Act. The documentary evidence of this review comprises the classified list of suggestions that had been received detailing source, nature of comment and author, arranged under principal headings (accounts, etc.); a covering memorandum analysing this listing; and a round-robin minute on which the senior BOT officials express their opinion.

The covering document, prepared within the Companies Department, notes that following the introduction of CA 29 there had been the slump in US stocks and shares, several failures among public companies and also the publicity of the Royal Mail case. It comments that:

The result . . . has been that the Companies Act 1929 from the first has undergone close scrutiny in the eyes of the press and of the public as well as of those in closer touch with its workings.

This early document then goes on to discuss the significance of the various suggestions for reform that had been received and catalogued by the BOT, and pulls out a list of six headings of suggestions on matters perceived within the BOT as being of major importance. These were grouped together as Category A, being matters of such importance that an amendment of the law might be countenanced.

The two issues that concern us most directly from this list are:

1. Accounts: Suggestions that the form of the Profit and Loss Account and Balance Sheet should be prescribed and that certain definite items should be disclosed and that hidden reserves and misleading 'lumped' items should not be permissible.

—Calls for Holding Companies to publish consolidated balance sheets and explain the relationship and transaction between holding companies and subsidiaries.

2. Auditors: Mr Henry Morgan, president of the Incorporated Society of Accountants and Auditors suggests that the auditor's certificate should be extended to the Profit and Loss Account.

The other headings included in this Category A are Declaration of Solvency, Names, New Issues and Share Transfers. Heading the list, however, are the criticisms and difficulties relating to accounts and auditors.

The tone of this document is such that early amendment of the law is certainly countenanced and the round robin minute reveals that the senior officer of the Companies Department, J. J. Willis, Comptroller, is also of this mind. He comments:

Probably the most important subject is that of accounts. A great deal has been written in the past year or so on the question in the technical and daily press, and it shows great diversity of opinion, even among those qualified to speak... There seems however to be a strong body of opinion in favour of some amendment.

Willis goes on to discuss the diversity of opinion about accounting and virtually the whole of his comment is directed at accounts. The attitude from the Companies Department of the BOT is one that reflects a possibility of rapid company law amendment, especially in the accounting area.

The decisive attitude, however, to the possibility of early reform is expressed in the comments on the round-robin minute by Sir Charles Hipwood, Second Secretary, who had originally asked for the memorandum to be prepared. He comments:

The first thing that strikes one about this list is that, considering the nature of the depression through which we are now proceeding, it is not much worse than it is. There are a number of major points which will have to be considered but they are practically all of them points on which business opinion is divided and it cannot be said that there is any one outstanding defect of such cardinal importance that it requires immediate legislation.

The revised and consolidated Companies Act came into force in November 1929 and has

therefore been in operation for less than two and a half years. It is a good thing to let codes of this kind work for at least, say, ten years before giving them anything like a comprehensive revision.

I would suggest that this useful list should be kept up-to-date and the various points mentioned in it should continue to be watched, but, subject to this, no action should be taken by the Board of Trade. (Charles Hipwood, 1 March 1932)

Thus ended any potential within the BOT for swift amendment of CA 29 arising from the events of 1931 including the Royal Mail case. For the purpose of understanding the process of change in the company law we may note firstly the significance that was accorded to the problems being experienced with accounting and secondly the desire simply to let CA 29 run for at least ten years. Hipwood also alluded to the diversity of opinion that had been expressed upon the subject of accounting and this diversity of opinion and its consequences is something which we discuss further below. All three of these elements we shall see are continual themes in the remaining years up to the establishment of the Cohen Company Law Amendment Committee. This early review however was to set the tone of the BOT reply to demands for amendment, which was that the time was not yet ripe for a review.

1932-1934

In the latter months of 1931 and the early months of 1932, while the BOT was deciding against a review, Mr Henry Morgan, President (1929-1932) of the Society of Incorporated Accountants and Auditors (SIAA) was doing his utmost to campaign for a change in the law relating to accounting. He was described by the *Daily Herald* of 23 February 1932 as a 'champion of investors' and the *Financial News* of the same day said that 'Mr. Morgan must have the support of every investor in the plea which he is making for greater clarity'. Over this period he made a series of speeches which were reported in the press (and thus were collected in the file of press cuttings which the BOT was keeping) relating to financial accounting reform. His three principal themes were:

1. the undesirability of secret reserves;
2. the need for detailed and audited profit and loss accounts;
3. the need for consolidated accounts.

In this initiative he was supported at first by *The Accountant* which in its editorial of 16 January 1932, reporting a speech by him relating to profit

and loss accounts, agreed with all points and commented:

Indeed the more one considers the matter, the more extraordinary appears the omission of the legislature to realise the essential importance of the profit and loss account.

However, the reforming lobby championed by Morgan was not able to achieve a consensus on the need for reform and they were to be opposed, among others, by Lord Plender (formerly William, later Sir William, Plender). This is the source of the diversity of opinion to which we have already referred and which was noted by the BOT. In a speech given to the Insurance Institute on 1 February 1932 and reported in *The Accountant* on 13 February 1932, Plender commented:

The more one studies the question and the wider one's experience is of balance sheets in actual practice, the more one is convinced that there is no change desirable in the fundamental basis upon which balance sheets of public companies are drawn up.

This paragraph has been highlighted in the Board of Trade cutting. The diversity of opinion which was cited and which so influenced the views expressed in Sir Charles Hipwood's memorandum was largely, it seems, this dissent by Plender. We discuss this further below. The *Financial News* editorial of the following day reported Plender's speech and appreciated its significance. It commented:

It is a little distressing to find a great leader in the accounting world like Lord Plender opposing the movement for the enforcement of more informative company accounts so decisively as he did in his address to the Insurance Institute of London yesterday. Such an opinion backed by the weight of his experience must exert a very considerable influence. We do not think, however, that in this address he by any means made out a good case for his views.

Plender, however, who had been President of the ICAEW 1910–12 and also 1929–30, remained unabashed and went on, in a speech to the Chartered Accountants Student Society of London (CASSL) on 25 April 1932, to defend secret reserves. He said that:

The average investor was not averse to directors adopting a cautious policy in strengthening the financial position of a company by reasonable inner provision for contingencies which overtook most companies at some period of their existence. . . . I cannot say that compulsory disclosure of the amount of all inner reserves would be desirable in every case and so long as they are made honestly and prudently there may

be advantages and often considerable justification for their existence. (*Financial News*, 26 April 1932)

The school of thought represented by Plender, which we shall see later was to be, in effect, characterised as the Old School, was a principal stumbling block for the campaign for the reform of accounting law. There clearly existed very different understandings as to the role of accounting and how it should best be practised. The very existence of this diversity was a deterrent to action on reform by the BOT, as the BOT saw that it would have the task of resolving problems that expert opinion could not.

The campaign for reform, however, was particularly insistent. The SIAA had appointed a committee in November 1931 to consider the advisability of any amendment to CA 29 and their report was issued on 25 April 1932 (possibly stimulating Plender's speech to CASSL). It was submitted to the BOT and called for legislation to ensure that:

1. The profit and loss account should show the true balance of profit or loss for the period covered by such account;
2. In the profit and loss account, any debits or credits which are abnormal in character or extraneous in their nature to the ordinary transactions of the company, together with any reserves from a previous period no longer required, should be stated separately;
3. Free reserves should be disclosed on the face of the balance sheet;
4. Where a holding company has investments in subsidiaries, there should be stated on the face of the accounts of the holding company the total amount of the ascertained profit or losses of such subsidiaries.

The members of the committee were Mr Henry Morgan (Chairman), Mr E. Cassleton Elliott, Mr Thomas Keens, Sir James Martin and Mr C. Hewetson Nelson, a very eminent panel and each one at some time a President of the SIAA, and their report was greeted with a considerable accolade in the press. The *Financial News* editorial of 28 April 1932 commented:

It would seem that one of the two big associations in the accounting profession is now more or less committed to a demand for a true profit and loss account to be required by law.

We have already seen, however, that the BOT had only just decided against a review. Sir A. M. Samuel asked questions in the House of Commons on 3 May 1932 about the consideration that the BOT was giving to the report but received only assurances that the report had been examined and carefully noted for review in connection with any subsequent legislation.

Notwithstanding these barriers to change there does appear to have been some considerable pressure for company and accounting law reform. *The Accountant's* editorial of 9 July 1932 is unguardedly favourable toward reform (an attitude which it had to modify later). It comments:

There is significance in the fact to which our columns testify almost weekly that the accounting profession both individually and collectively is strongly in favour of reforming company law... The defects in the existing law... can broadly be divided into two categories relating to the responsibility of directors and the form of published accounts... The accounting defects of the 1929 Act are many, but the principal shortcomings are capable of being summarised briefly. They are:

1. An adequate form of profit and loss account should be defined and made legally compulsory...
2. The valuation of physical assets should be informative...
3. The market value of investments... should be stated as at the date of the balance sheet...
4. The trading profit or loss of each individual subsidiary should be shown separately...
5. The identity of each of the subsidiaries should be disclosed...
6. When secret reserves are drawn on—for any purpose—both the amount and the nature of its allocation should be stated in the profit and loss account...

The editorial continues:

In the above brief summary we have purposely refrained from touching on such controversial measures as the publication by holding companies of consolidated balance sheets and the strengthening of the legal responsibilities of auditors and have confined ourselves to matters on which there is general agreement concerning the necessity for reform.

The unguarded claim of *The Accountant* to speak for the accounting profession, and its presentation of proposed reforms as the reflection of a consensus among accountants, caused some difficulty however, for the article was referred to in yet another attempt by A. M. Samuel in the HOC to achieve an initiative on company law reform. He moved on 15 March 1933 that:

This House, having been made aware of the losses sustained in recent years by private persons who have invested their savings in concerns organised under limited liability requests the government to set up a departmental committee to examine the provisions of the Companies Act 1929 with a view to amending the Act so that in

future the public may be protected against unscrupulous persons.

The debate was adjourned due to lack of time and lapsed but *The Accountant* of 25 March 1933 comments that:

the mover went on to quote from an article in our columns last year when we stated that the accountancy profession is strongly in favour of reforming company law on the grounds that existing legislation has proved itself to be inadequate. As we have already made clear, editorial opinions do not necessarily voice the views of any particular body of accountants and it is perhaps only fair to repeat again that side by side with the strong body of opinion which undoubtedly favours a revision of the law, there is also a strong body of opinion which believes that the desired end cannot be accomplished by legislation.

On the BOT original of this press cutting this paragraph is highlighted and once again this illustrates the reinforcement of the BOT's perception that reform, even if possible or desirable on other grounds, would be undertaken in the face of divided professional opinion.

The pressure upon the BOT for reform then devolved upon the Association of British Chambers of Commerce (ABCC). Once again the influence of Henry Morgan is evident because he was treasurer of the London Chamber of Commerce and a leading member of the ABCC. A rather vitriolic memo within the BOT later confirmed this influence by him when they attributed the pressure for an inquiry to the ABCC 'influenced by Mr Henry Morgan, an ex-president of the Incorporated Society of Accountants and Auditors' (BOT 13 December 1937).

At the ABCC annual meeting in 1932 a resolution was unanimously adopted urging the Government to consider the amendment of CA 29 in conformity with present-day experience and requirements. A committee was appointed and they produced a report on 23 August 1933. In sending it to the BOT, however, they requested the President of the BOT to receive a deputation in order that they might have an opportunity of impressing upon the President the importance of their proposed amendments.

The receipt of this report in the BOT together with the earlier pressure of the SIAA report and A. M. Samuel's motion in the House of Commons prompted a second internal review on the issue of company law reform. Once again Mr. J. G. Henderson, OBE, MC, Principal of the Companies Department, prepared a memorandum and there is a round-robin minute documenting the responses of senior BOT officials. These are extremely infor-

mative about the influences that were important in the decisions affecting company law.

Mr Henderson's memo comments that the following three matters appear to be of major importance: Accounts, Underwriting and Directors. As regards accounts it comments that both the ABCC and the SIAA recommend amendment of the law relating to the accounts of holding companies, to the level of detail in balance sheets and profit and loss accounts and to secret reserves. The memorandum continues:

I think that the case against the general amendment of a statute so comprehensive as the Companies Act 1929 after comparatively short experience of its working still holds good, but if it should be found impossible to resist the pressure for the amendment of the Act the most useful field to explore might be that of Accounts, a field which is comparatively limited but important. In a Bill with some such title as 'A Bill to amend the law relating to Accounts of Companies' it might be possible to deal with the question of holding companies . . . and with the more detailed prescription of the content of balance sheets and profit and loss accounts as well as the question of the publication of the profit and loss account. At the same time there would undoubtedly be difficulty resisting pressure for an enquiry into amendment of the Act in other respects, even though an attempt were made to limit the preliminary enquiry to Accounts. It is not suggested that the question of directors' liability or underwriting should be touched at present. Once these questions were introduced it would be even more difficult to limit the scope of any inquiry into the amendment of the Act and also difficult to limit discussion in Parliament on the Bill . . .

It should be observed that opinion is not unanimous as to the need for reform. Sir A. M. Samuel . . . quoted an article from *The Accountant* where it had been stated that the accountancy profession was strongly in favour of reforming company law on the ground that existing legislation had proved itself to be inadequate. In an editorial on the subject *The Accountant* stated that side by side with the strong body of opinion referred to there was also a strong body of opinion which believed that the desired end could not be accomplished by legislation.

To sum up, while amendment in a limited field might be undertaken, even for this purpose it would be necessary to appoint a committee including representatives of commerce, accountancy and the legal interests, to enquire into and report on the questions involved, and the announcement of such an inquiry would undoubtedly increase the pressure for general

amendment; it would become more difficult to resist the pressure although it cannot yet be considered that experience of the working of the present Act is sufficient to ensure that amendment is necessary, or that it would be possible to include all the amendments which further experience might find to be necessary.

J. G. Henderson
31 August 1933

Accounting reform, then, was once again being actively considered less than four years after the introduction of CA 29 and fifteen years before the eventual introduction of CA 48. There are however those same discordant notes: lack of unanimity, administrative difficulty, and the need for further experience of such a complicated code as the company law. In the round robin minute Henderson's memo is considered in the context of the response to be given to the ABCC deputation. The absence of a consensus on the need for reform, however, together with a pragmatic desire to restrict the scope of any enquiry, ensured that no reform of the law relating to accounting was forthcoming.

Mr. Hodgson, at that time Under Secretary at the Board of Trade, who figures in a major way later in our story, recommended that it should be indicated to the ABCC deputation that the time was not yet ripe for a review. He explained that within the ABCC report:

the most important group of recommendations centre around the question of accounts and the duties of auditors . . . In regard to these recommendations it may be said that there is some lack of unanimity of opinion in trading and professional circles and addresses by Lord Plender to the Insurance Institute and to the Chartered Accountant Students in 1932 may be read as indicating some dissent from these specific recommendations.

Hodgson, 9 November 1933

Sir H. Hamilton, Permanent Secretary, concurred, pointing out that the Act was only four years old and calling particular attention to the last two and a half pages of Mr Henderson's note, i.e. to the lack of unanimity of opinion and the difficulty of carrying out a restricted inquiry. Dr Leslie Burgin MP, at that time Parliamentary Secretary to the BOT, also concurred.

Accordingly, when the deputation from the ABCC attended the BOT on 16 November 1933, despite such eminent men as Sir James Martin, Henry Morgan and P. D. Leake being among their number, they received little satisfaction. The minutes of the meeting record that:

The President expressed his appreciation of the care with which the Special Committee had examined the questions before them but

indicated that there might be some doubt as to whether expert opinion was entirely unanimous on many of the matters under consideration. He also pointed out that day by day interpretation of the existing law was becoming clearer, but assured the deputation that the recommendations of the Committee would be carefully considered by the Companies Department.

The themes that we have already identified were thus evident again in this second internal review. The issue of accounting reform was clearly seen as a decisive issue. In H. B. Samuel's influential book *Shareholders' Money*, published in 1933, we find the following comments (page vii): 'The present impetus of company law reform tends mainly to be confined to the question of company accounts'. Nevertheless, divided professional opinion upon the need for reform, the desire within the BOT to leave the companies legislation unchanged for a period of years, and the difficulty of attempting a revision of accounting legislation alone, thwarted the pressure for reform.

A postscript to this event occurred a year later when Henry Morgan tried again, in person, with a visit to Dr Leslie Burgin at the House of Commons. His efforts this time, however, were concentrated on one topic. Dr Burgin's memorandum to a BOT official records that:

Mr Morgan said that there was really one matter, the importance of which exceeded all others, and that it was the question of subsidiary companies... Mr Morgan thought that a limited bill, limited to accounts, balance sheets and profit and loss of subsidiary companies would do away with nine-tenths of the agitation for amendment. He says there has been a progressive deterioration in the last five years on the part of public companies in the disclosure of useful information in their accounts to their shareholders.

The Companies Department's Mr Henderson drafted yet another memorandum (12 October 1934) in answer to Burgin's. He comments:

The whole question of disclosure in relation to subsidiary companies was discussed by Mr. Cutforth, who is the President of the Institute of Chartered Accountants, in *The Accountant* for 7th July 1934. It is clear from this paper that Mr Cutforth regarded the question of subsidiary companies as of very considerable importance and of no little complexity... Mr Cutforth concluded his remarks on subsidiary companies with the following words:- One is rather led to wonder whether after all it might not be preferable that the Act should remain as it is and that the directors and auditors should be left with the full discretion as to whether from the share-

holders view it is right and proper that further information should be given.

Once again division of opinion within the accounting profession prevented any possibility of reform although even without this particular division that possibility was by now remote as we have seen. In their profile of Cutforth, Kitchen and Parker (1980) comment on some of the more entrenched attitudes that he espoused at this time: 'Perhaps we should not complain that by the 1930's Cutforth's innovative drive seemed to have spent its force'. History does not record whether Mr Morgan was so forgiving.

Mr Henderson's memo also queries whether in fact there had been a deterioration in standards of accounting. He comments:

there have from time to time been commendatory remarks in the press on the informative nature of some companies' accounts and it is almost a truism that the practice of many companies and auditors goes beyond the requirements of the law.

He cites in support of this contention several companies' accounts including those of the Dunlop Rubber Company Limited (where F. R. M. de Paula had been instrumental in issuing a full set of consolidated accounts).

So it was that Burgin wrote to Morgan on 15 December 1934 saying:

the more closely I look into the matter the more I am convinced that further experience of the working of the Act is desirable before a fresh inquiry is instituted.

With this exchange the second major episode in the attempts to reform CA 29 and the accounting provisions within it drew to a close. The SIAA had failed and so had the ABCC, not to mention the hundreds of other commentators listed in the BOT's files of suggestions. The principal causes of the failure in this intense period of pressure for reform were the desire within the BOT to leave matters unchanged for a period of several years, particularly when the experience gained of the legislation had all been within an abnormal period of economic depression, and the obvious existence of divided opinion among professionals. The ABCC continued to send annual reminders to the BOT of the recommendations of their report, but after the end of 1934 the focus of pressure for reform, as perceived within the BOT, shifted back to Parliament. Although in the end his efforts failed, the hero of the period was undoubtedly Henry Morgan. With his speeches after the Royal Mail case, his responsibility for the reports of both the SIAA and the ABCC and his final attempt to persuade Burgin, he was at the focus of attempts

to change financial accounting. He appears to have deserved the title 'champion of investors'.

The late 1930s

With the failure of these initiatives the pressure for reform as perceived by the BOT slackened off although there continued to be acerbic comment on the issue. For example *The Accountant*, reproducing an article from *The Economist*, commented:

In all company accounts, the proper bias should be towards greater and not less publicity. Arguments for suppression usually spring either from interested motives or from exaggerated fears. We should not demand less however as a first instalment than an amendment of the laws relating to profit and loss accounts. (*The Accountant* 9 November 1935)

These comments were duly recorded by the BOT, but the momentum of the pressure for reform had dwindled and no action or review was forthcoming.

The next source of pressure for company law reform came primarily from concern with issues other than accounting, although this provided a new vehicle for the campaign for accounting reform. The BOT press cuttings record the eruption of the scandal of share-pushing and other stock dealing irregularities during 1935. A BOT memorandum of 15 September 1936 records:

The pressure for revision of the Act had relaxed in 1935. Its renewal before the recess this summer arose probably not from any defect in company law that had been brought to light, but from one or two cases in which outside stock and share dealers, by methods which merely amount to common fraud, had robbed the public.

The pressure was renewed in questions and a debate on share dealing in the House of Commons on 11 June 1936.

Seizing upon the opportunity of possible company law reform on the issue of share dealing, however, there were questions in the House the following month which attempted to widen the scope of any review of the company law.

Mr Owen Evans and Mr Robert Morrison on 7 July 1936 asked whether the President of the BOT would at an early date appoint a departmental committee to examine the criticisms of the company law that had been received. Mr. Runciman, the President, then agreed to look into the matter. He said:

I am not convinced that the time is ripe for such an enquiry but it is my intention again to examine the question in all its bearings before the end of the year.

It is not clear in the questioning, or indeed in the answers, what weights were being accorded to the various issues then circulating in the pressure for reform: the share dealing problems, accounts, and other issues we have documented in passing such as directors' responsibilities. The closest answer perhaps is that all the issues appear to have become blurred into a general pressure for reform although this was separated and analysed later within the BOT. The Board of Trade however was thus committed to an internal inquiry by the end of 1936.

Hodgson of the Board therefore instructed the Comptroller of the Companies Department, Mr Marker, to prepare the documentation for an internal inquiry, although he expressed the opinion that he still thought the time was not yet ripe for a comprehensive review.

Mr Hodgson's opinion on the need for company law amendment does not seem to have been altered by more hostile comment from the *Financial News* of 18 September 1936 which asked:

What holders of Rank shares can derive any information whatsoever from the accounts? Investors may wonder whether the directors, very rightly feeling that the present law was inadequate, decided to prove it by *reductio ad absurdum*.

The available documentation of the late 1936 inquiry comprises a review of the issues by Mr Marker, a summary document by Hodgson and a round-robin minute sheet recording the senior BOT officials' opinion.

Mr Marker's review, of 29 October 1936, comments:

The movement for an inquiry comes in the main from two quarters:

- (a) Mr Henry Morgan (as ex-president of the Incorporated Society of Accountants and Auditors) who has moved the Association of British Chambers of Commerce to pass resolutions in favour of amendment; and
- (b) the man in the street who is concerned not with Company Law amendment at all, but with bucket shops and share pushing.

The memo does not, however, seriously discuss the possibility of general company and accounting law reform and comments:

So far as Company Law amendment is concerned there is no real case for enquiry at present . . . In the absence of unforeseen circumstances it would seem that an enquiry could hardly be justified until the present Act has been in force for at least ten years if then.

On the second area of concern however the memo is more encouraging:

As for bucket shops and share pushing, the

position is different and the case for action in regard to this admitted evil is much stronger... Perhaps if the matter should be pressed in the House of Commons the President might promise to consider the setting up of a Committee to enquire into the problem.

This document sets the tone of the 1936 review and echoes the comment we saw earlier by Sir Charles Hipwood that ten years should elapse as a minimum before review.

Mr Hodgson comments informatively upon how the issue of accounting reform has now come to be seen:

The demand for company law amendment is put forward principally upon the ground that greater publicity in the financial affairs of companies will assist and protect investors, enable shareholders to exercise more effective control and deter reckless conduct on the part of company promoters and directors.

To modern eyes this appears an elegant and entirely reasonable statement of some central assumptions about accounting. In 1936 however these ideas were not compelling and Hodgson thus continued:

In brief the demand is not a cure for present evils but for safeguards against possible and rather vaguely apprehended dangers.

Where no immediate and serious defect is demonstrable a review of such a comprehensive subject as company law becomes largely a matter of imposing on all companies requirements based on the practice of the best companies which is generally in advance of legal requirements. In the absence of reasons of urgency, a period of seven years since the Act of 1929 seems too short to have created a position in which such review can be undertaken to the best advantage and I agree with Mr Marker that the comprehensive review should wait some further time yet.

It is interesting to note how the BOT attitude to accounting reform had changed and the key to this really lies in Hodgson's comment that no immediate and serious defect was demonstrable. The pressure of the early 1930s in the wake of the Royal Mail case and the reports of the ABCC and SIAA had died down and the sense of impropriety associated with the operation of the company law had thus faded. The incentive for the BOT to act to remedy this impropriety thus also faded and although they were to concern themselves with the problems generated by irregular share dealings, there was no pressing need for them to act on company and accounting law more generally. The question of reform was thus once again shelved.

The issue then lay dormant as far as the BOT was concerned, although external comment was still voiced on the subject. *The Secretary* of September 1937, for example, published an article by H. C. Holman, FCIS, which contained an extensive and detailed examination of proposed Companies Act amendments. The next consideration of the subject by the BOT, however, was in response to a Mr Bellenger's motion for a debate in the House of Commons on 15 December 1937. Mr Bellenger, described by *The Scotsman* of December 8, 1937 as a socialist MP, tabled a motion to call attention to the need for amending the Companies Acts.

The BOT then were required to prepare briefing documents and justifications of position for the Parliamentary Secretary, then Captain Euan Wallace, to use in responding to the debate. These documents are largely rehashed versions of earlier statements we have seen, although the tone is rather harsher and polemical as befits defence documents. The principal document comments, 13 December 1937:

Probably with the promise of early legislation to deal with the various real abuses—share pushing etc., the drive behind Companies Act amendment legislation will be found to have largely disappeared.

As we have seen above, the provisions of the Companies Act relating to accounting were no longer seen by the BOT as permitting 'real' abuses.

The debate on 15 December 1937 lasted some four hours and Mr Bellenger and his supporters ranged among other things over the questions of accounting by holding companies and of profit and loss accounts. The Government adopted the position however that legislation would be quickly introduced to deal with the abuses of share pushing etc., but a general inquiry into the operations of CA 29 could not be considered.

One of the justifications given for this by Captain Wallace was that:

the people most competent to deal with this extraordinarily technical subject are not at the present moment all agreed either as to the urgency of the amendment of the Act or of the form that amendment should take.

He did, however, have to hedge rather under further questioning as to whether that meant he was saying a committee of inquiry would not be set up:

What I have tried to convey to the House is that insofar as a general comprehensive reform of the Companies Acts is concerned I cannot do more than say that the Government recognises the need for setting up an inquiry which must precede such reform.

However, he went on to say that the Government would find it difficult to find time for such legislation in view of its busy programme and the BOT while dealing with the share pushing legislation would find it difficult to staff and manage the committee.

The outcome was that the motion was voted down and the Government's position was left as a delaying one in which they had recognised that there was a significant body of concern for reform, but that they were not minded to do anything yet.

If Parliamentary time and BOT time were under pressure from as early as 1937 it was clear that little was thus likely to be done as the impending international crisis loomed closer. Mr Bellenger tried, asking on 11 July 1939 yet again for an inquiry to be set up.

Mr Stanley, then President of the BOT, replied, however:

There is at the present moment so much extra urgent work, due to war emergency, falling on my Department that I could not contemplate placing upon it the extra work which would be involved by an inquiry of this kind. I certainly recognise the need for a revision of the Companies Act when that is possible, but it must be when there can be some relaxation of the present war emergency efforts.

And thus came to an end the third of our periods, that between 1935 and 1939. In the initial periods of pressure for a comprehensive review the BOT had resisted on the grounds that the length of time that had elapsed was deemed to be too short, that there appeared to be a measure of dissent amongst those pressing for reform, and that the issues complained of were not really company law issues or even ones that company law amendment could solve. With continued criticisms and the passage of time, however, their defence for inaction began to rely increasingly upon the lack of Parliamentary and administrative time available. After the processing into law of the proposals relating to share pushing it may well have been difficult to withstand the pressure for an inquiry had the pressure of work due to the war not become prohibitive. With the commencement of hostilities, however, company law reform slipped down the agenda and BOT documentation is extremely sparse for the next three years. We therefore move forward to the reappearance of company law reform discussion at the end of 1942.

The establishment of the Company Law Amendment Committee (CLAC)

The President of the Board of Trade under whose auspices the committee of inquiry into company law was set up on June 26 1943 was Hugh Dalton, Labour. It is tempting to assume that he

set it up as a reflection of the pressure that some Labour MPs, among them Mr Bellenger, had brought to bear for reform. Dalton was the first Labour President of the BOT since William Graham, who was President in 1930. Such an assumption, however, would be misguided for it is revealed in a letter of 6 May 1943 from Dalton to Viscount Simon that it was in fact 'Sir Edward Hodgson who originally suggested to me the desirability of instituting this enquiry'. The file copy of this document had been signed as seen by Hodgson himself, confirming that it was he who provided the initiative. Hodgson was by this time the longest serving member of this most senior part of the BOT and had been involved as we have seen in many of the earlier deliberations. He had joined this section as Under Secretary in 1933 and was by 1942 Sir Edward Hodgson, Second Secretary (with Sir Arnold Overton as Permanent Secretary). Dalton's diary (in Dalton's papers, File 7/4, British Library of Political and Economic Science) records that he was not impressed with Hodgson when he first went to the BOT. He comments:

Aged 63; apparently unknown or rather non-existent and therefore for his job (No. 2 to Overton) a complete farce.

Perhaps Hodgson's initiative on the question of company law reform went some way to softening this judgement for in an entry of 25 June 1943, discussing the appointment of the CLAC, Dalton is at least a little less scathing, and comments:

I next see Hodgson and urge him to be audacious, revolutionary and Bolshevik in his approach to the whole question. I think he is enjoying it a good deal.

The file on the appointment of the CLAC opens with what appears to be the documentary evidence of the first suggestion by Hodgson to Dalton for a company law inquiry. Signed by Hodgson and dated 22 December 1942, its tone is radically different from the BOT discussions we have seen before. It reviews the past developments and comments

By the summer of 1939 it was felt that the time was fast approaching when another comprehensive inquiry into the company law would have to be held and but for the war it is likely that a Committee would have been appointed.

Hodgson then goes on to urge the importance of now appointing such a Committee. He comments:

The experience of the department... strongly suggests that the law should be strengthened to provide greater publicity in regard to the formation and affairs of a limited liability company and for better safeguards for investors and shareholders.... There has also been a growing

claim that the interests of the community, as distinct from those of the shareholders, should have more recognition in the formation and conduct of a corporation.

It is suggested that what is wanted now is a broad inquiry into the basic principles underlying the company law so that in the difficult years following the war we may be sure that we are building on a basis erected to modern needs.

Clearly the sympathies expressed in this document are very much more in favour of reform than anything we have seen hitherto within the BOT. Hodgson himself only six years earlier had dismissed the demand for company law reform as 'not a cure for present evils but for safeguards against possible and rather vaguely apprehended dangers'. The development of a greater sympathy for the objects of company law reform, however, was also apparent in the wider BOT (he was supported by the Permanent Secretary Sir Arnold Overton) and in the Government which allowed Dalton to set up the CLAC. It ultimately resulted in the proposals that became CA 48 and can be seen as a reflection of the changes in social attitudes stimulated by the war. A very much stronger awareness of a need for social fairness was one of the products of the war, one that was documented by Titmuss (1976) in his study of the effects of war on social policy. Titmuss comments that 'the war could not be won unless millions of ordinary people in Britain and overseas, were convinced that we had something better to offer than had our enemies—not only during but after the war'. This requirement of war strategy was stated more explicitly in a memorable leader in *The Times* (1 July, 1940) soon after the last British troops had left the Dunkirk beaches. It was a call for social justice; for the abolition of privilege; for a more equitable distribution of income and wealth; for drastic changes in the economic and social life of the country.

The effect on social policy of these changes in social attitudes was profound and they gave rise to such initiatives as the Beveridge report on Social Insurance.

It seems that the effect on company policy was also profound. Two leading articles in war issues of *The Accountant* give us an idea of the changes that had taken place. *The Accountant* of 25 October 1941 comments in a leader entitled Companies and Post War Reform:

We therefore suggest that the time is not now too early for the appointment of a committee charged officially with the duty of preparing a new Companies Bill. The Parliamentary reports show that the pigeon holes of the BOT must by now be bursting with suggestions which have been ministerially noted for future attention. . . . There can be no question but that the great mass point plainly in the general direction

of securing first a greater measure of candour in disclosing the financial results of the use of publicly subscribed money and second towards the more thorough inculcation of the growing public conviction that directorship of a British company is in itself a species of moral trusteeship towards the British nation.

They return to the topic a few months later and under the same title develop some more specific recommendations. With regard to profit and loss accounts they comment:

there can be no possible doubt that with hardly any exception profit and loss accounts as now published form a sorry collection . . . We are well aware that the defence or excuse commonly urged is the alleged necessity of withholding information which might be used by competitors but we have always thought that that point rests on a very flimsy basis of fact. It is moreover right out of line with the rapidly developing sense that industry is less a matter of the adventuring of private money for profit than the rendering of a public service to the commonwealth. It was for the public good and not for private gain that the principle of limited liability was enacted and it seems to us that there is a moral obligation that those who benefit by its operation should be prepared to allow every facility for criticism and control in the public interest. We think for these reasons that Parliament should assume power to call for the publication of profit and loss accounts from which both shareholders and public might derive really trustworthy material for the formation of reliable judgements. (*The Accountant*, 25 April 1942)

These articles appear to reflect the national mood of the war years and help to explain the new attitude towards company law reform evident within the BOT.

Once the idea of reform had been suggested to him Dalton was enthusiastic and energetic. By 15 February 1943 a document had been prepared outlining what he proposed to do. It says:

Much will depend after the war both for the nation and for the individual on ordered development and responsible conduct of limited liability companies . . . I propose therefore to set up at once a small committee under a strong chairman to examine the principles of the company law and to consider whether any major reforms are necessary to provide better safeguards for the investor, the shareholder and the public interest and greater publicity in regard to the formation and affairs of a limited liability company, and if so to suggest what they should be so that a measure may be prepared for introduction at the right moment.

Dalton was not however a cabinet minister and had to canvass support for this initiative. He thus sent this memorandum to William Jowitt, Minister without Portfolio, another Labour MP, asking for his opinion and support (23 February 1943). When this was forthcoming Dalton approached Kingsley Wood, the Chancellor, a Conservative, and his support also was forthcoming. Both these two played a significant part in the suggestion of the names for the constitution of the committee.

Once the political obstacles had been overcome, Dalton and the BOT finalised the terms of reference and started to draw up lists of possible names. We may limit our interest to the choice of chairman and the choice of an accountancy representative.

A letter from the BOT in February 1943 reveals the criteria felt to be appropriate to the choice of a suitable accountant. Sir Arnold Overton writes that:

my idea of the qualifications would be:

1. really first class;
2. of the younger school;
3. while not generally known (necessarily) as a first class man regarded as such by those best able to judge.

The most interesting of these criteria is clearly the requirement for someone of 'the younger school'. The respondents to these various letters seemed to understand what was meant by this and it is clear that what the BOT were trying to avoid was getting an elder statesman, like Lord Plender for example, whose views would, assuming they were unchanged, be clearly inappropriate to the mood of radical change which was now driving the search for reform.

The choice of an accountant however was swift. As soon as the green light had been given politically, Hodgson drew up a draft list and that featured two accountants: Sir Harold Howitt and Mr. Russell Kettle. Pencilled by these names are Howitt's age, 57, and the comment: '? A younger man'. Kettle, although not young himself, was thus one of the front runners from the start, but the Treasury pushed quite strongly for him to be on the Committee. The Civil servant at the Treasury approached by Hodgson for names wrote back, on 29 January 1943:

Thinking over your request the other day for any Treasury suggestions of names of accountants to serve on your Advisory Committee on Company Law, I find it a little difficult not to put Mr Kettle first. It is not very long since he was appointed our accountant adviser... The very fact that he is not a member of the younger set means that he has a fund of experience which we ourselves are certainly finding valuable.

Kingsley Wood, the Chancellor, also supported this suggestion and wrote to Dalton, 15 April 1943:

As regards an accountant would you care to consider Kettle of Deloittes who is of course well known to your department. I gather that he was partly instrumental in starting up an unofficial committee of the Institute to examine the question of the amendment of the Company Law, and this might be a useful link. Of his personal qualifications I need hardly speak.

Given the need for political support from the Treasury this was presumably decisive. The other names that figured briefly besides Howitt and Kettle were Barton of the firm Barton Mayhew, Benson of Coopers, Robson of Price Waterhouse, and Dowling of McLintocks in Glasgow. All of them, however, were beaten by the support for Kettle.

The choice of a chairman for the committee was far more difficult. The name that Hodgson included on his draft list was Viscount Samuel, the A. M. Samuel who had been so active over the past thirteen years and whose comments led to the first opening of the BOT files on the subject. This however was rejected immediately. The first choice of chairman was Sir Walter Monckton. He was approached but declined as he felt that he was not really in touch with the subject matter.

After this set-back, Dalton wrote to the Chancellor, on 21 April 1943, asking for further names and commenting that 'my feeling is for someone not too old, not too set in his ideas and not too expert, although preferably I think a lawyer'. Dalton also wrote to Jowitt who suggested three candidates in the following order:

1. Mr Cyril Radcliffe
2. Mr Lionel Cohen
3. Mr Wyn-Parry

The Chancellor however suggested Lord Justice Clauson and Mr Justice Bennett. Of Clauson he said 'he has a great reputation on the subject and although he is elderly (73) I am assured that he is very lively-minded still'. Dalton then offered the position to Lord Justice Clauson but he too turned it down on grounds of age and rusty acquaintance with the subject matter.

Dalton was upset by this second refusal and wrote to Kingsley Wood saying: 'this second refusal following Monckton is disappointing and I am most anxious to fix up the chairman without further delay'. He went on to advise the Chancellor that he intended to approach A. L. Goodhart, Professor of Jurisprudence at Oxford. He did in fact do so and Goodhart indicated, a file note of 13 May records, that he would accept if invited.

This suggestion however did not sit well with Kingsley Wood who wrote:

On consideration I doubt if Goodhart would be suitable for the job. He is of course eminent and I understand that he is ingenious, but he also has the reputation of being a little academic and I imagine you will want someone with a good business sense and a firm pair of hands to hold the strong committee you are getting together.

He went on to suggest that a judge would be an appropriate choice and suggested Bennett or Cohen.

Thus, Cohen was approached, via Viscount Simon, and he accepted the post. Dalton was pleased: he knew Cohen personally. He wrote in his diary of 29 June 1943 about the CLAC that: 'It will I think make a dint in our financial and I hope our legal history'. The CLAC was formally appointed on 26 June 1943. Its terms of reference were:

To consider and report what major amendments are desirable in the Companies Act 1929 and in particular to review the requirements prescribed in regard to the formation and affairs of companies and the safeguards afforded for investors and for the public interest.

Thirteen years of pressure had eventually produced the required inquiry. This paper does not detail the deliberations of the committee or discuss its findings. The CA 47 gave effect to its recommendations and this was consolidated into the CA 48. The principal battle for change in accounting practice however had been won in the establishment of the committee of inquiry.

Conclusions

The pressure for reform of the company law and the accounting practices regulated by it commenced almost as soon as CA 29 was enacted. Yet a decade of campaigning produced no tangible results. Certainly that pressure put company law reform on the agenda—files existed on the subject within the BOT, the various arguments had been aired in the press, within the BOT and in the HOC and the issue rumbled into prominence every so

often. But no progress that affected observed accounting practice had been achieved.

The principal immediate cause of the change in that state of affairs appears to have been the change in social attitudes engendered by the war and the need, as the war drew to a close, to address the issues of rebuilding the economy in the post war period.

Whether a review of company law would have taken place in the early 1940s had the war not intervened is a matter for speculation. As we have seen the passage of time was gradually weakening the arguments for not holding an inquiry and it may well have been that an inquiry would have only been delayed a little while longer. What the outcome of such a review might have been in such different circumstances we cannot know.

The course of events that did materialise means that the establishment of the Cohen Committee must be understood as a consequence of changes engendered by the war. The recommendations of that Committee, how they were formed and how they related to accounting practice and thought at that time are the subject of another research project. Yet the recommendations could not have been produced, and thus neither could CA 48, without the initial establishment of the Committee of Inquiry. The origins of the piece of legislation that was to govern modern accounting practice therefore have to be understood as rooted in the tumult of the Second World War.

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Usefulness of CCA Information for Investor Decision Making: A Laboratory Experiment

Keith Duncan and Ken Moores*

Abstract—The aim of this study was to test the assertion of New Zealand company directors that CCA information was not useful for investor decision making. Subjects made investment decisions based on their predictions concerning two similar, real (identity disguised) companies. These decisions and other evaluations were made in a post-test only, control group design experiment. CCA's relevance and reliability according to particular definitions of these characteristics was thus assessed. The results show that current cost accounts are more useful for investor decision making because they are both more relevant and perceived to be more reliable than conventional historical cost accounts.

Introduction

The New Zealand Society of Accountants' CCA-1 Standard (Information Reflecting the Effects of Changing Prices) became a mandatory reporting requirement as from April 1982. By the end of 1983 it was apparent that a large majority of the country's listed companies were not complying with its requirements.¹ Of the reasons given by company directors for non-compliance, a significant proportion were categorised by Peterson *et al.* (1984) as implying either the 'non-relevance' or the 'subjectivity and complexity' of such CCA information. These negative statements by company directors about the relevance and reliability of CCA information imply that such information is not *useful* to investors.

In contrast to the directors' comments, the objective of the CCA-1 Standard states that it is intended to provide *more useful* information. CCA accounts are expected to better facilitate an assessment of 'the financial viability of the business' and 'return on investment' by managers, shareholders, investors, and others in their decision making than historical cost accounts.

The primary qualities that make accounting information useful for decision making are relevance and reliability (FASB, 1980, p. x). Relevance essentially refers to the ability of information to make a difference to the predictions and decisions made

by the user of that information.² Reliability refers to the ability of the information to represent what it purports to represent. These definitions suggest that the objective of financial reporting is to provide information that has the ability not only to make a difference in decision making but also to do this so that investors, creditors and other users make decisions more congruent with their objectives. In this sense, investors' decisions are seen as better if they are superior in terms of a decision criterion (i.e. maximisation of return on investment) and if they result from greater prediction accuracy.³

The apparent discrepancy between these objectives of financial reporting in general, the CCA-1 Standard in particular, and the statements of directors of non-complying companies raises a number of research questions. Three such questions form the basis of this study:

1. Do decision makers make different decisions and predictions using current cost information to those made using only historic cost information?
2. If these decisions and predictions are different, are they 'better' in that the predictions and decisions better reflect the actual results of the firm?
3. Is any particular information set used in making these decisions perceived as being more representative of what it purports to represent?⁴

*The authors are grateful to Ken Ferris, Andrew D. Bailey Jr., and colleagues at the University of Otago for their comments on earlier versions of this paper. Useful comments were also received from two anonymous reviewers as well as participants at an accounting workshop at Griffith University, in particular Peter Booth, Neil Cocks and Ray McNamara.

¹A survey by Peterson, Gan and Lim (1984) showed that of 147 companies only 12 had complied with the CCA-1 Standard. See also McManamy (1983).

²FASB, 1980, p. xvi.

³This qualitative evaluation assumes that the subjects were all rational, economic, wealth maximising investors.

⁴'Credibility of source' is controlled in that both sets of data come from the same source, that is the firms themselves.

In the following sections, we distil from the literature concepts relevant to these three research questions which are then reformulated as testable hypotheses. The final sections outline a laboratory study conducted, the results obtained, and conclusions drawn.

Prior research and hypotheses

A large proportion of the literature on the usefulness of current cost accounts has been focused at a 'market' level by noting share market reactions to the release of such information. Within efficient capital markets share prices reflect the market's assessment of all publicly available information, and so these studies contend that current cost information is useful to investors in general if its release has an impact on share prices. Most of these studies⁵ found no share market reaction to the release of CCA information and hence concluded that the information was not useful.

However it is also held that annual reports and CCA information are of use to shareholders for long-term investment decision making, notwithstanding the absence of any short-term market reaction to their release (Barton, 1980 and Hines, 1982). This is because, *inter alia*, they serve a confirmatory or non-confirmatory role with respect to the information which investors have previously received.

A second research perspective focuses upon the decision making of individuals. A wide range of 'individuals' have been the subjects of studies adopting this research orientation.⁶ Associated with this subject diversity has been the variety of research designs employed by the researchers in this area.

Despite this richness in research styles, McEnroe and Nikolai's (1979) review of the literature concluded that research has found virtually no conclusive evidence that either general price level or current cost information is superior to historical cost information for investor decision purposes. This inconclusiveness, however, could be the result of inadequate or inappropriate research designs. Consequently unless future studies incorporate design lessons learned from the past it is likely that the evidence will remain equivocal. The current study overcomes the equivocality of prior results through incorporation of many of these design lessons.

Relevance Characteristic

An operational definition of relevance has been problematic. Most of the individual level studies

have examined degrees of perceived 'usefulness' and have not really measured relevance (e.g. Murdock, 1983). However there is no guarantee that respondents' espoused theories agree with their theories-in-use (Argyris, 1977). Because of this it is difficult to know if perception of usefulness is equivalent to actual use. Also these perception scales do not measure the relevance of current cost accounting data in terms of the FASB's (1980) definition of relevance. That definition refers to actually making decisions and/or predictions. This implies that a specific decision/prediction task has to be performed in order to measure relevance.

Other studies have used more tangible measures of relevance: 'goodness' of decisions, difference in decisions and predictions, and predictive ability (McIntyre, 1973; Frank, 1969; Simmons and Gray, 1969; and Norton and Smith, 1979). Most of these studies required a specific task to be performed. Despite the criticisms that have been levelled at some of these studies there are three important operational measures that can be distilled from them: predictive ability, difference in decisions, and decision accuracy. Consequently, we adopt as our operational definition of relevance, calculations based on measuring predictive ability, difference in decisions, and decision accuracy of the subject group during the performance of specific prediction and decision tasks, i.e. investors making return on investment predictions and investment decisions.

Relevant information has been operationalised as being information that produces decisions that are 'different' and 'better'. 'Difference' has been measured by direct comparison of the investment decisions between the treatment groups in a two-company choice (McIntyre, 1973). Decisions were 'better' if they maximised return on investment, the decision criterion that the subjects were instructed to use (McIntyre, 1973).

A measurement approach such as difference in investment decision is consistent with the definition of relevance. It is also consistent with the objective of financial reporting (according to the FASB) and the objective of the CCA-1 Standard. Therefore, making a difference to the decision of choosing which of two companies is the best investment, is an appropriate test of three different forms of reporting: historical cost accounts only; CCA-1 accounts only; and CCA-1 accounts as supplementary to historical cost accounts. In the null form:

Hypothesis 1. The company selected by the investors as the preferable investment will not vary with the information sets presented.

Although the decision difference is very precise, as a measurement scale it may not be sensitive enough to detect any differences in decisions between the information sets used. A ranking of the favourability of investing in each of the companies

⁵For a review of studies of this type see Lev and Ohlson (1982) and Beaver (1982).

⁶For example financial executives, financial analysts, bank loan officers, business students, stockholders, management and auditors.

is a more sensitive way of measuring investment decision differences. Specifically:

Hypothesis 2. The investors' rankings of the favourability of investing in either of the companies will not vary with the information sets presented.

Predictive ability has been applied in an investment decision situation in which surrogate investors were required to predict the share prices for the three years immediately following the three year period on which they had received information (McIntyre, 1973). The problem with share price prediction is that capital appreciation represents only part of the return on shareholders' investment. Their return consists of both dividend and capital returns. Return on investment would therefore appear to be a more relevant variable for investors to attempt to predict.⁷

Therefore a further analysis of the relevance of the data in the different information sets can be performed by testing for a difference in the return predictions. This test can be extended to see if those subjects who make 'correct' investment decisions perceived the future rates of return differently from those who make 'incorrect' choices.⁸ In the null form:

Hypothesis 3. The rate of return on investment predicted by the investors will not vary with the information sets presented nor with the investment decisions made.

These predictions can be tested further to see if they are 'accurate' when compared to the actual results in an *ex post* evaluation.⁹ This has not been conducted in any of the reviewed works. It is hypothesised that those who make more 'accurate' predictions are receiving more relevant information on which to base their decisions. This relationship is stated in the null form as follows:

Hypothesis 4. The predictive accuracy of the investors will not vary with the information sets presented.

Reliability Characteristic

An accurate measure of reliability has proved elusive in the study of usefulness. This lack of a

generally accepted operational definition of reliability hinders the study of usefulness and relevance. This is because the former is regarded as a product of the interrelationship between relevance and reliability.¹⁰ In an early conceptual contribution, Ijiri and Jaedicke (1966) concluded that the degree of reliability is the important criterion that will ultimately determine the extent to which the decision-making public will accept and use accounting measurements. Furthermore, they observed that reliability cannot be measured unless it is related to a particular use of the accounting measurement. Previous empirical studies (McCaslin and Stanga, 1983 and 1986; and Stanga, 1980) have typically surveyed users to measure *perceived* reliability of particular information items. While such survey approaches presume a use, no explicit decision is involved. Consequently we have sought perceptual measures of reliability in the context of an investment task.

Further, the prior studies (Stanga, 1980 and McCaslin and Stanga, 1983, 1986) have all used Stanga's five point Likert-type scale to measure perceived reliability in terms of 'very reliable' to 'very unreliable'. As this scale does not measure any of the specific dimensions of reliability identified in the FASB definition, it is less representative as an operational measure of perceived reliability.

In investigating possible operational measures of reliability we identified that the concept verifiability, a frequently used synonym for reliability (Solomons, 1978), offered a ready-made measure. Two studies (Haried, 1972 and McNamara and Moores, 1982), have used semantic differentials and factor analysis to distil five specific dimensions of verifiability: real, exact, tangible, measurable and objective. However, employing these dimensions to elicit user *perceptions* can arguably be reported as a measure of perceived reliability. We have adopted this view and henceforth refer only to reliability.

We have no prior expectations about differential perceptions of reliability with respect to the three information sets. Accordingly this is stated in the following null form:

Hypothesis 5. The perceived reliability of the financial statements will not be less for any one of the information sets.

Relationship Between Relevance and Reliability

Employing the FASB's definitions of relevance and reliability, Stanga's (1980) tentative finding was that these two characteristics were positively associated. McCaslin and Stanga (1983) furthered

⁷Assessment of risk is not examined explicitly in this study. However if we assume that investors implicitly employ the two-parameter asset-pricing model then their assessment of returns will automatically involve a consideration of risk.

⁸'Correct' or 'better' decisions are defined as choosing the company that satisfies the maximise return on investment criterion and vice versa for 'incorrect'.

⁹'Accurate' or 'better' predictions are defined as a significant correlation between the actual and predicted rates of return, and vice versa for 'inaccurate'.

¹⁰Using a particular measure of reliability, Stanga (1980) found that the two characteristics, relevance and reliability, were positively associated.

this work by testing to see if there was a trade-off between the two qualitative characteristics. They found that relevance and reliability were not independent qualities, and that relevance may in fact be determined in part by how much reliability the information is perceived to possess. More importantly they suggested that if information is not 'sufficiently' reliable then it will not be relevant for any actual decisions. This suggests that in order accurately to measure the expected positive association between relevance and reliability the researcher must ensure that the information has a minimum level of reliability (see, also, Institute of Chartered Accountants in England and Wales, 1984).

McIntyre (1973) endeavoured to circumvent this problem of providing a minimal level of reliability by using real company reports as his historical cost accounts. Unfortunately he had to use indices to produce all his current cost accounts and the problem with this is that it is difficult to construct unbiased current cost accounts from outside the firm (McEnroe and Nikolai, 1979). Therefore, in this study, a minimum level of reliability has been provided by using real company data (accounts) where available.¹¹ This strategy resulted in only one of the six CCA reports being produced using company valuations and indices, thus representing a substantial improvement on prior studies.

As a positive relationship between relevance and reliability has been found previously it follows that, if one information set is shown to be more relevant, then it would be expected to be no less reliable than any other set. Relevance was measured in terms of 'correctness' of the decision made and 'correctness' of the favourability rankings. Therefore it was expected that, for each of the three information types, there would be a significant positive relationship between perceived reliability and the 'correctness' of the decisions made and 'correctness' of the rankings assigned. Succinctly the null hypothesis is:

Hypothesis 6. The perceived reliability of the financial statements for each of the information sets will not vary with the investment decisions made nor the favourability rankings assigned.

Design and method

To resolve many of the conflicts in previous studies we emphasised internal validity and chose an ex-

perimental design. The experiment required final year undergraduate accounting students, as surrogate investors, to analyse the data provided on two companies for investment decision making. There were two parts to the experimental task. The first involved deciding which company was the preferable investment on the basis of their predicted return on investment. This was measured by the responses to three different questions. The second part involved ranking the perceived reliability of the financial statements.

The Subjects

It was necessary to use a group of subjects who were financially competent so as to avoid any confounding effects.¹² A convenience sample of final year undergraduate accounting students was chosen as they have sufficient accounting experience to qualify as surrogates for financially competent investors.

The Treatments

As the basis for analysis and decision making, each subject received the following information items for two companies:

1. Financial statements (balance sheets, income statements and notes to the accounts).
2. Commonly used financial ratios (% change sales, gross and net profit ratios, current ratio, proprietary ratio, EPS, return on shareholders funds).
3. Dividend record.
4. Market price of the companies' shares (at a common date after the release of all companies' financial statements and payment of dividends).

The financial statements, ratios, dividend record and share prices were for the years 1979, 1980 and 1981. The reason for using these three years was that it allowed a three year period (1982-1984) after the decision date for which there was market data on dividends and share prices. This data was necessary to evaluate the accuracy of subjects' rate of return predictions.

The financial statements were supplied to provide a basis on which investors could assess the sales and earnings pattern of the firms as well as their financial position. The ratios¹³ were presented to reduce the time required by the subjects in identifying the key relationships. The dividends

¹¹It could be argued that not even the companies can 'reliably' estimate the current cost of assets. However this argument really only applies where indices are used extensively to value specialised plant or a mix of plant and machinery (Shriver, 1987). The assets of the companies in this study mainly consist of ships, land, buildings and vehicles with some specialised plant. Further the majority of these were valued by independent valuers, not by the companies using indices.

¹²Tweedie (1985a, 1985b) has shown that those shareholders/investors with accounting experience read the financial reports more thoroughly and they also have above average understanding of the information in the report.

¹³The ratios were used by McIntyre (1973) and in prediction studies such as Norton and Smith (1979), and are identified as being important for financial statement analysis by Popoff and Cowan (1981).

and share prices were presented as they are the key data for assessing and predicting the rate of return on investment (McIntyre, 1973).

The data display for each subject was limited to two companies (one matched pair) in a manner similar to McIntyre (1973). The addition of further companies would have increased the complexity of the experimental task and the risk of experimental mortality. There were two sets of criteria used in selecting the firms to be used in the study. Firstly the industry was chosen using three criteria:

1. The industry was capital intensive, so that the current cost depreciation adjustments would be significant.
2. The industry had to carry significant levels of stock with increasing replacement cost.
3. There was a sufficient number of firms in the industry from which to draw a pair of companies.

The first two criteria ensured that current cost accounting income was substantially different¹⁴ from the historical cost income. The third requirement is a constraint imposed by the size of the New Zealand share market. After examining the aggregate accounts of the major industry groups in the Reserve Bank Statistics (1980–1983) it was decided that the manufacturing industry best met the criteria above; in particular, building materials manufacturers.

A second set of criteria were used to select the two firms from the industry. The selection criteria were:

1. Pairs should have different age structures for their fixed assets.
2. Individual companies should not be affected by a major external influence such as a take-over.
3. There should be a large enough difference in the rates of return earned on paired firms to make opposing decisions significant.
4. Information on which to prepare CCA-1 statements must be available.¹⁵
5. The companies' *ex post* beta measures should be about the same. This is so that the risk adjusted returns of the companies are comparable in terms of systematic risk.
6. The companies should be of similar size.

The companies within the building materials industry were then evaluated against the second set of criteria. Financial information on the specific companies was obtained from the Company Report Library, Department of Accounting and

Finance, University of Otago. Betas for criterion five were obtained from Securities Research Company Ltd (1984).

The pair that best met the criteria were Golden Bay Cement Company Ltd and New Zealand Cement Holdings Ltd. In order to disguise the identity of these companies in the experiment they were renamed Building Supplies Co. Ltd. and Construction Supplies Co. Ltd. respectively, and hereafter they are referred to as 'Building' and 'Construction'.

The information sets, as described above, were produced from publicly available data and presented in two booklets.¹⁶ The share prices¹⁷ were as at 1 June for each of the years. The rest of the treatment data was summarised and standardised financial information from the company reports for the respective years.

The only problem in the preparation of these 'treatment' accounts was that Construction did not produce CCA accounts for 1979. Therefore University of Waikato (1982) price indices were used in conjunction with the published data to produce CCA accounts. This is not a serious limitation as it is only the first of the three 'data' years for one company. This is an improvement on prior studies that have had to use indices for all their current cost accounts.

The Treatment Groups

A multi-group experimental design was used in which the three comparison groups were equivalent through the use of random assignment. The study was a post-test only, control group design. Because of the way the three treatments were structured, there were in effect two control groups: those that received only historical cost accounts (HC) and those that received only CCA accounts (CCA). The remaining group received both sets of accounts (BOTH).

Measures

Instrument Development

The measure of relevance consisted of a three-question instrument.¹⁸ Firstly McIntyre's (1973) difference in investment decision was used. This involved the comparison of the investment decisions made by the different treatment groups. The second measure was developed as a finer measure of investment decision. It involved the subjects ranking, on a ten point Likert-type scale, the favourability of investing in either of the companies. The final measure was adapted from the prediction studies (Frank, 1969; Simmons and

¹⁴Less than half.

¹⁵For the period 1979–1981 CCA accounts were produced under the Society's CCA guidelines GU-1. These guidelines are essentially the same as CCA-1 and became effective from 1 April 1979.

¹⁶Available from authors on request.

¹⁷As quoted in *The New Zealand Financial Times/Review*, (1978–1984).

¹⁸Available from authors on request.

Gray, 1969 and Norton and Smith, 1979). It involved the prediction of the rate of return expected for each company for the three years after the decision date. With these three measures there was a possibility that the subjects might carry over their responses from one question to another. To overcome this 'learning' effect, the order of the questions was randomised.

The second part of the experimental instrument was a perceived reliability questionnaire¹⁹ which was developed from McNamara and Moores (1982) and Haried (1972). It was decided to use those adjective scales that commonly loaded on the verifiability factor in these prior studies. Finally the order of the two parts of the experimental instrument was randomised to avoid any systematic learning effect.

Pre-test

The instrument was tested in two stages. Firstly comments from the staff of the Department of Accounting and Finance at the University of Otago were elicited and secondly a pilot test was conducted using volunteers from the University's Master of Business Administration (MBA) class as the subjects. The completed pre-test instruments evidenced no problems with understanding, following and completing the instrument. The pre-test responses were not included in the results as they were not completed under experimental conditions.

Responses

The experiment was administered to 120 volunteer final year accounting majors. The students were randomly assigned to treatment groups by distributing the instruments and treatment accounts in a random order. For control purposes the subjects were instructed to expect the regulated and stable economic conditions of the first three years to prevail for the following three years. It was felt that this did not present a serious limitation given that these conditions did in fact eventuate. To avoid any interaction effects the subjects were not informed of the three treatment groups.

Despite the early departure of thirteen of the students experiment mortality was not considered a serious problem. The number of responses for each group was within about one standard deviation (3.2) of the mean (36) number of responses for all the groups.

Of the 107 responses only 82 (76.6%) were valid for all the questions. However 18 of the 25 non-completed instruments were valid except for the prediction of return on investment question. The results in the next section include in the statistical tests all cases for which there was a valid response.

Results and discussion

All the analytical techniques used in this study are non-parametric equivalents of the standard parametric t-test of two means or analysis of variance (ANOVA). The reason for using non-parametric tests, which are 5% less powerful than the parametric tests, is the nature of our data. In particular it would be inappropriate to impose the assumptions of the parametric tests on nominally scaled investment decision data or the ordinally scaled favourability and perceived reliability rankings. Further the only ratio scaled data, the rate of return predictions, were highly skewed, making the use of parametric statistics (that assume a normal distribution) invalid.²⁰

The first hypothesis, that the company selected by the investors as the preferable investment would *not* differ with the information sets, was rejected. A higher percentage of subjects (37.1%) in the HC group made 'incorrect' decisions than was the case for the two other groups (CCA: 8.3%, BOTH: 6.5%). A Chi-squared test reveals that these differences were significant ($\chi^2 = 13.87$, $p < 0.01$).

Similarly it was hypothesised that the investors' rankings of the favourability of investing in either of the companies would not vary with the type of information received. A Kruskal-Wallis One-Way ANOVA was used to test whether the favourability rankings of each company were significantly different between treatment groups. Table 1 shows that there was no significant difference between the treatment groups in their rankings for Building. This is as expected because Building was the 'correct' investment choice. In contrast the 'incorrect' choice, Construction, was ranked by the HC group as significantly more favourable on average than by the other groups. This rejection of the second hypothesis is consistent with our finding for the first hypothesis that the HC group made 'incorrect' decisions more frequently. These experimental results indicate that current cost information is *relevant* in investment decision making in that it facilitates different and 'better' decisions.

The third hypothesis was that the predicted rates of return on investment would not vary with the information sets or the investment decisions. To test for differences between treatment groups of their rate of return (ROR) predictions, a median test was preformed. This test compares the distribution of each treatment group or subsample to the overall median for the whole sample. Table 2 summarises the average position (greater than, less than, or equal to) of each group relative to the median. Clearly the ROR predictions were found

¹⁹Available from authors on request.

²⁰This is to be expected as financial ratios have been shown to be highly skewed in previous empirical research. See Foster (1986, pp. 104–109).

Table 1
Test of Favourability Rankings Between Treatment Groups

Company	Treatment Group			Chi-squared Statistic
	HC	CCA	BOTH	
Building	55.90‡	50.65	45.70	2.0597
Construction	38.63	58.33	56.63	9.7958***

‡Mean rank from Kruskal-Wallis One-Way ANOVA.
*** $p < 0.01$.

to be significantly different across the three treatment groups. Table 2 shows that the CCA group's predictions tended to be lower than the BOTH group and that the HC group tended to have the highest predictions. The conclusion is that the CCA and BOTH groups made different (lower) predictions than the HC group, thus rejecting the first part of the third hypothesis.

For the second part of this hypothesis we used a Mann-Whitney U test to examine whether the

distribution of the ROR predictions for each company were different between the correct and incorrect decision makers. This part of the second hypothesis was also rejected as we found (see Table 3) that the predicted RORs were related to the investment decisions made. As expected, subjects who decided to invest in Building predicted significantly (at $p < 11\%$) higher ROR than those that decided to invest in Construction. The reverse but insignificant pattern was found for the pre-

Table 2
Between Group Comparison of Rate of Return Predictions

Prediction Company and Year		Median	Treatment Group			Chi-squared Statistic
			HC	CCA	BOTH	
Building	X4	6.2	GT‡	LT	EQ	11.2***
	X5	6.8	GT	LT	EQ	12.3***
	X6	7.1	GT	LT	EQ	12.3***
Construction	X4	4.0	GT	LT	EQ	14.1***
	X5	4.1	GT	LT	EQ	13.8***
	X6	4.9	GT	LT	EQ	19.7***

‡Average position of group relative to median from Median test.
*** $p < 0.01$.
GT: Greater than.
LT: Less than.
EQ: Equal to.

Table 3
Between Investment Decision Comparison of Rate of Return Predictions

Prediction Company and Year		Investment Decision		1 Tailed <i>p</i>
		Correct vs Incorrect		
Building	X4	53.2‡	43.6	0.11
	X5	53.5	42.0	0.07*
	X6	53.8	40.9	0.05*
Construction	X4	50.7	55.3	NS
	X5	50.5	56.1	NS
	X6	50.3	57.1	NS

‡ROR mean rank for Mann-Whitney U test.
**p* < 0.10.
NS: Not significant *p* > 0.20.

Table 4
Between Group Comparison of Actual and Predicted Rates of Return

Prediction Company and Year		Actual	Treatment Group			Chi-squared Statistic
			HC	CCA	BOTH	
Building	X4	13.3	LT†	LT	LT	2.0
	X5	2.6	GT	EQ	GT	10.8***
	X6	-16.7	GT	GT	GT	0.0
Construction	X4	-1.7	GT	EQ	EQ	18.8***
	X5	0.4	GT	EQ	EQ	14.2***
	X6	21.9	LT	LT	LT	2.2

†Average position of group relative to actual from Median test.
 *** $p < 0.01$.
 GT: Greater than.
 LT: Less than.
 EQ: Equal to.

dicted RORs for Construction. Thus there is some evidence to suggest that the second half of hypothesis 3 should also be rejected.

That there was no difference in the accuracy of the predictions was the fourth hypothesis. Once again a median test was employed to analyse the data though, this time, we measured the average position of each treatment group's predictions for each firm relative to the *actual* return rather than the sample median. The results in Table 4 provide some evidence to reject this hypothesis in that we can be 99% confident that the CCA and BOTH groups were more often superior in their predictions than the HC group.

The overall conclusion of hypotheses three and four is that current cost disclosures in either form are more relevant in terms of their predictive ability, than historical cost statements alone. Because greater predictive ability leads to greater

decision making accuracy (Beaver *et al.*, 1968) it can be concluded that the use of current cost accounts in predictions does result in better investment decisions. These results of hypotheses one to four are more conclusive than those of McIntyre (1973) in showing that current cost accounts do provide more relevant information than historical cost accounts.

The fifth hypothesis, that the perceived reliability of the treatment financial statements would not be statistically less for any one of the treatment groups, was supported. The results in Table 5 are split into between (panel A) and within (panel B) group tests of differences in reliability rankings. The fact that the BOTH group received and ranked financial statements prepared on historical cost and current cost bases necessitated this approach. Panel A of Table 5 reports the results of two Kruskal-Wallis One-Way ANOVAs of the

Table 5
Inter- and Intra-treatment Group Tests for Differences in Perceived Reliability

Financial Statement Ranked		Panel A Inter-group Comparisons		Panel B Intra-group Comparison
		HC vs CCA vs BOTH (HC)	HC vs CCA vs BOTH (CCA)	BOTH (HC) vs BOTH (CCA)
Building	PL	†NS	0.15	†0.05*
	BS	NS	NS	0.06*
Construction	PL	NS	NS	0.06*
	BS	NS	NS	NS

†Significance of Kruskal-Wallis One-Way ANOVA.

†Significance of Wilcoxon matched-pairs signed-ranks test.

* $p < 0.10$.

NS: Not significant $p > 0.20$.

PL: Profit and loss statement.

BS: Balance sheet.

Table 6
Test of Relationship Between Investment Decision and
Perceived Reliability

<i>Financial Statement Ranked</i>		<i>Panel A</i>	<i>Panel B</i>
		<i>HC and BOTH (HC)</i>	<i>CCA and BOTH (CCA)</i>
Building	PL	‡NS	+ve*
	BS	NS	+ve
Construction	PL	—ve**	+ve**
	BS	—ve**	+ve

‡Significance of Kruskal-Wallis One-Way ANOVA.
 ** $p < 0.05$.
 * $p < 0.10$.
 NS: Not significant $p > 0.20$.
 PL: Profit and loss statement.
 BS: Balance sheet.

between group differences in perceived reliability of the financial statements of each company.²¹ Panel B of Table 5 contains the results of a within group comparison of the perceived reliability of the two different sets of financial statements received by the BOTH group. However because we are comparing two related samples we used a Wilcoxon Matched-Pairs signed-ranks test. Essentially this tests whether the majority of one sample are higher (or lower) than the majority of another sample.

The first between group test (Panel A Table 5) revealed no significant difference in the reliability rankings by the BOTH (historical cost accounts), HC and CCA groups. The second between group comparison for the BOTH (current cost accounts), HC and CCA groups' rankings produced similarly insignificant differences. Thus hypothesis 5 was supported.

A more significant result was found (Panel B Table 5) for the within-group test of the BOTH group's ranking of their current cost and historical cost statements for Building. They perceived the current cost statements for Building as *more* reliable than the historic cost statements. They also perceived Construction's CCA Profit and Loss Statement as being significantly more reliable than the HC statement. Hypothesis 5 then is not only supported, but can be extended. On the basis of the evidence above it could be stated that the CCA statements are perceived to be *more* reliable than the HC statements.

The last hypothesis concerned the relationship between perceived reliability and relevance. It stated that the perceived reliability of the financial statement for each of the treatments would not vary with the investment decisions made nor with

the favourability rankings assigned. To analyse whether the perceived reliability varied with the investment decision made we again used a Kruskal-Wallis One-Way ANOVA. However because we had perceived reliability rankings for two types of information, HC and CCA, we separated the sample and ran two tests.²² Table 6 Panel A represents the results for the HC information and panel B those for the CCA information.

Panel B of Table 6 shows that there was a significant positive relationship between the reliability rankings of the CCA information and the investment decision made. The correct investment decision makers ranked both companies' CCA statements as more reliable than the incorrect decision makers. In contrast negative and insignificant (positive) associations were found for the HC statements (Table 6 Panel A). These results imply that the *more relevant* CCA information (results of hypotheses 1 to 4) was also perceived to be more reliable.

The analyses from Table 6 were re-run but substituting the ranking for the favourability of investing in each company as the explanatory variable. Panel A of Table 7 contains the results for the historic cost information and panel B the results for the current cost information. In contrast to the results in Table 6 the question of the relationship between the favourability rankings and perceived reliability rankings is not clear. Table 7 reports negative, positive and insignificant relationships for the CCA statements and insignificant results for the HC statements. However these results do not contradict those in Table 6 as they are more a function of the limited power of non-

²¹Four pair-wise comparisons, not reported here, produced similar results.

²²We also ran four individual tests, one for each of HC, CCA, Both (HC) and Both (CCA), the results were similar to those in Tables 6 and 7.

Table 7
Test of Relationship Between Favourability of Investing
and Perceived Reliability

<i>Financial Statement Ranked</i>		<i>Panel A</i>	<i>Panel B</i>
		<i>HC and BOTH (HC)</i>	<i>CCA and BOTH (CCA)</i>
Building	PL	‡NS	+ve*
	BS	NS	NS
Construction	PL	NS	−ve**
	BS	NS	NS

‡Significance of Kruskal-Wallis One-Way ANOVA.
 ** $p < 0.05$.
 * $p < 0.10$.
 NS: Not significant $p > 0.20$.
 PL: Profit and loss statement.
 BS: Balance sheet.

parametric ANOVA techniques when applied to small samples and multi-point measurement scales, than any systematic differences.

Generally, hypothesis 6 was rejected for those receiving the current cost accounts. They perceived and used the information 'correctly' more often, and they tended to make 'better' decisions. Those that made 'correct' decisions also tended to rank the current cost statements as more reliable. That is, the relevance and reliability of the CCA statements were positively associated characteristics.

Conclusion

The use of an experimental design automatically limits our results and conclusions to the subjects, treatments and environment of this study. Therefore the significance of our evidence is limited. However, contrary to the generalisable yet inconclusive prior studies, the objective of the current study was to reach an unequivocal conclusion as to the usefulness of CCA information.

In the context of this experiment CCA information was found to provide more relevant information. This is because the treatment groups receiving such information made different and 'better' decisions than those receiving HC information. Furthermore, current cost accounts were found to result in different and 'better' favourability rankings and slightly more accurate rate of return predictions. Complementing these findings, the CCA financial statements were perceived to be just as, and possibly more, reliable than the HC statements. Finally reliability was shown to be positively associated with relevance.

The conclusion from this experiment is that, contrary to directors' comments, current cost statements are more useful for investor decision making than conventional historical cost disclosures. In fact supplementary current cost disclosures are

more useful because they are both *more* relevant and perceived to be *more* reliable for making investment decisions. Further these findings are consistent with the logic of the normative literature on accounting for price changes.²³ These conclusions are, of course, subject to a number of limitations.

A concern with such studies is that they can confound the content issues with other changes in information display such as load (Snowball, 1980). Failure to control for load could result in misleading inferences being drawn from the results. While this point is acknowledged as a potential threat to validity, the results in this study indicate that this was not the case. The BOTH group had greater information load in that they received more cues than the other groups during the experimental time. However they managed to predict more accurately (see Table 4) and were more confident, as indicated by their favourability rankings (Table 2), about their decisions. This improvement in information processing by the subjects who were under higher load conditions indicates that overload conditions were probably not reached by any of the subjects.

A further problem is that student subjects may perform experimental tasks differently from 'real' investors (Alpert, 1967) and there may also be motivational problems associated with using students. The implicit reward structure, satisfaction in completing the task, may not provide sufficient motivation for the students to perform the tasks carefully (Birnberg and Nath, 1960).

Another limitation relates to the failure of 18 of the respondents to supply valid answers to the prediction question, despite the significant results

²³For a discussion of alternative price changes models, see Henderson and Peirson (1985).

for hypotheses 3 and 4. There are several possible explanations for the uncompleted questions, which may also affect the prediction results in general. Firstly, the assumption that the current economic conditions would prevail for the three prediction years is quite simplistic. Secondly, the three year period could be too long for predictions. Even for real investors this time horizon may be too distant. A third explanation is that the arbitrary share price data may affect any comparison of RORs by the subjects. The final point is that the 'real' world investors, when making predictions, have much more information on which to base their analysis (Tweedie, 1985b). None of these possibilities could be explicitly tested.

A concern relates to perceived reliability. The fact that reliability was not perceived differently by the HC or CCA groups could be because they did not have any accounts prepared on contrasting bases to provide relative rankings. The BOTH group, which did have two different account types, ranked them differently. This also could not be tested.

However the observations of directors perhaps were not intended as statements of fact but rather as political, public relations statements. Their real reasons for lack of disclosure could therefore be investigated through the search for economic incentives (disincentives) for non-compliance (compliance). The tentative findings of Wong (1985) suggest that political costs and tax considerations provide some explanation for the decision by some firms voluntarily to disclose current cost statements in the five years prior to the issuing of CCA-1. However a vast potential exists for further work employing the Watts and Zimmerman (1978) framework on data from the period after the CCA-1 standard became effective.

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The Role of Financial Appraisal in Decisions to Acquire Advanced Manufacturing Technology

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Abstract—There have been suggestions that the financial appraisal techniques which are commonly applied to capital expenditure proposals may be unsuitable for evaluating proposals concerned with the acquisition of advanced manufacturing technology. This paper reviews the arguments advanced to justify exempting such proposals from financial appraisal. It is argued that the case against financial appraisal is not substantiated. The difficulties cited by the critics of financial appraisal can be resolved by better management of the appraisal process.

Introduction

Manufacturing technology has been changing rapidly in recent years. Individual numerically controlled (NC) machines have been closely followed by computer aided design (CAD) and the development of flexible manufacturing systems (FMS). The new equipment allegedly offers a wide range of attractive advantages including:

- (a) speedy response—greatly reduced lead times between order and delivery;
- (b) flexibility—rapid switching from one product to another with the ability to produce small batches economically; and
- (c) enhanced capability—manufacturing operations which were not previously feasible can be successfully undertaken.

A number of recent publications in both Britain and the USA have expressed concern that many companies are failing to use advanced manufacturing technologies as fully and as rapidly as their authors believe they should. In suggesting reasons, authors (e.g. Hayes and Garvin, 1982 and New, 1985) frequently identify the financial appraisal of capital expenditure proposals as a major stumbling block. Shortcomings alleged include a bias against long-term investments enforced by cash flow discounting and by management attitudes, together with an inability to reflect the value of the full range of improvements in operating methods which can be expected to follow the adoption of advanced technology. Proposed remedies range from changes in the methods of financial appraisal to its complete elimination from the capital expenditure decision-making process, at least where the acquisition of advanced technology equipment is under consideration.

The case for the existence and scale of the benefits which are alleged to flow from an investment in AMT is made elsewhere (for example, New, 1985 and NEDO, 1985). Managers will assess how far these benefits appear to be attractive to and attainable by their companies and may propose capital expenditure accordingly. Financial appraisal is one of the tests which such proposals must usually pass in their progress towards final approval. It has been argued (King, 1975, and see also Cooper, 1975 and Kennedy and Sugden, 1986) that the role of financial appraisal is to provide an acceptable rationalisation of judgements which have led the sponsoring managers to recommend proposed capital expenditures. Alternatively financial appraisal may be seen as a formal part of the decision-making process which leads up to recommendation (for example, chapter four of Samuels and Wilkes, 1986). Whichever view of the role of financial appraisal may be preferred, the suggestion is being made that it is failing to fulfil its proper function with respect to proposals for the acquisition of AMT.

This paper attempts to review recent British literature concerned with the financial appraisal of proposed investments in advanced manufacturing technology along with some corresponding publications from US sources and to consider the merits of the criticisms of the financial appraisal process as an obstacle to investment in new equipment by manufacturing companies.

The main thrust of the argument will be to suggest that the criticisms noted above have confused two important issues:

- (i) the validity of the conceptual basis for

- financial appraisal of capital expenditure proposals, and
- (ii) the effectiveness of the conduct of financial appraisals.

Many of the criticisms really concern the second of these issues and the error lies in their authors' assumption that, because they can find weaknesses in the conduct of capital expenditure appraisals, then there must be a flaw in the case for having a financial appraisal at all. Similar arguments against abandoning appraisal will be found in a recent American article (Kaplan, 1986).

The criticisms

Strategic Review as a Substitute for Financial Appraisal of Capital Investment Proposals

(a) Some authors would like to see the financial appraisal of capital investment proposals either abandoned entirely or recast into some sort of rather vaguely defined strategic review. Holders of this position argue that financial appraisal is unable to make a useful contribution to the acquisition decision. The failure is usually ascribed to difficulty in accurate prediction of outcomes, to the impossibility of capturing all the relevant information within the financial calculations or to bias in favour of short term advantage.

The authors of a survey (Woods *et al.*, 1985) report that 37% of firms investing in new technology used no formal method for investment appraisal and comment that firms studied by them appeared to be more in favour of subjective judgement and assessment and were abandoning formal investment appraisal altogether. A recent operations management text (Hill, 1985) urges that what constitutes a sound investment needs to be measured by its contribution to the agreed corporate strategy and not by how well it meets the criteria laid down by a set of accounting rules and evaluations. An article in the professional accounting press (McDonald, 1985) makes a similar point in arguing that proposed investments in advanced manufacturing technology may have to be evaluated in relation to their likely contribution to the efficiency of the company's entire operations, as opposed to the conventional approach of appraising each proposed investment as a specific project.

Guidelines for applying these general principles to the evaluation of particular proposals are not offered. There appears to be an assumption that the successful pursuit of a strategic goal such as increasing market share is bound to have favourable financial consequences.

It would be difficult to quarrel with the general principle that proposed investments in advanced manufacturing technology should contribute to the agreed corporate strategy. Presumably this ideal

should be fulfilled by any proposed investment and indeed by all management decisions whatever their subject. If the principle is to apply then an agreed corporate strategy should exist and there must be a clear and consistent perception of that strategy by decision makers and by project sponsors. Assuming this condition to be satisfied, how are decision makers expected to choose between competing proposals which may all contribute to corporate strategy? The general principle on its own is insufficient.

Moreover, enunciating broad strategic goals such as increasing market share or maximising utilisation of manufacturing plant does not really avoid the issue of whether financial goals can be met. It is perfectly possible to conceive of companies which very successfully implement policies such as increasing market share and yet fail to earn satisfactory, or any, profits or to generate sufficient cash flow. Satisfactory financial results cannot just be assumed. The ability of a chosen strategy to deliver a desired level of financial performance must be explicitly considered before deciding to adopt it and when deciding how to implement it.

(b) Given contemporary interest in Japanese management skills some reference to their practice is fairly inevitable and in another recent professional article (Collis, 1986) it is suggested that Japanese managements apply logic and common sense to their problems rather than laboratory investigations and discounted cash flow calculations. Favourable reference to Japanese management practice is also made by some of the other authors cited. It appears to be assumed as obvious that the alleged superiority of Japanese management is associated with the apparent absence of formal financial appraisal as it is practised in Britain or the USA. The alternative question of whether Japanese decision making might benefit from more formal investment appraisal procedures is not seriously considered.

A study of Japanese methods of investment appraisal (Hodder, 1986) contradicts the view that financial review is disregarded. Formal calculations of NPV or IRR are not often found but this is attributed to unfamiliarity with the techniques rather than any considered rejection of them. It appears that project profitability is commonly assessed using cash flow projections together with an imputed charge for interest on the investment in the project. The rate of interest used is generally quite low.

The strength of Japanese practice is not seen by Hodder as being the displacement of financial appraisal but rather as the ability of their 'consensus' approach to decision making to handle risk and uncertainty. The assumptions underlying a project proposal are subjected to careful scrutiny by individuals from different backgrounds. The understanding arrived at through this procedure

seems to make it easier to trade off quick payback on risky projects against other considerations. This reduces the chance of important projects being rejected simply because they fail to satisfy a particular financial criterion.

Financial Appraisals Cannot Capture All Relevant Information

The points advanced in argument are mainly:

- (i) The present state of knowledge makes it impossible to produce such reliable cash flow forecasts as can be done for conventional technology, making financial analysis unreliable.
- (ii) Many important benefits from advanced technology, for example flexibility, are not susceptible to precise quantification.
- (iii) Spurious financial justifications have to be contrived to circumvent conventional investment appraisal systems where quantifiable savings are insufficient to secure acceptance for investment proposals.

Instances where proposed flexible manufacturing systems fail to show the expected advantage in ROI over more conventional alternatives are given (New, 1985). The failure is attributed to the omission from the comparison of any measure of the value of a list of advantages which the flexible manufacturing systems would offer, viz:

- (i) higher market penetration due to short, reliable lead times;
- (ii) repeatability of quality and decreased warranty costs;
- (iii) process dependability;
- (iv) protection from future inflation of labour costs;
- (v) volume flexibility for market response;
- (vi) no recruitment of layoff costs;
- (vii) increased utilisation of equipment;
- (viii) ready transferability to new products prolongs useful life (of equipment).

Similarly it is argued (Sheridan, 1986) that return on investment measures do not link well into long-term strategy and market advantage considerations. This is because the traditional evaluations do not give enough weight to the long-term benefits from better quality, shorter lead times and so on. There is little attempt to reflect the extra sales that could be achieved, the likely consequences of competitors' actions or the penalty for doing nothing. Another similar argument (Hill, 1985) urges that returns must be defined in terms of improved long-term competitiveness rather than just short-term measures. In Hill's view excessive use of ROI distorts strategy building. He also emphasises the importance of reflecting consequential changes to infrastructure and alter-

ations in working capital requirements. Similar arguments may be found in Gerwin (1982), Gold (1982), Senker (1984) and Dilts and Russell (1985).

This is a technical difficulty concerning the way in which capital investment proposals are presented and evaluated. It draws attention to some possible limitations on the significance of financial appraisal information. The issue is whether these limitations are so severe that they afford grounds for discarding financial appraisal entirely. There are several approaches available to mitigate the difficulties which are urged under this line of criticism.

(a) Beneficial consequences are ignored. More effort could be devoted to evaluating the financial consequences of changes in working methods which are likely to accompany the introduction of advanced technology equipment. Examples of these changes include reductions in inventory (raw materials, work in progress, finished items), reductions in scrap and rework costs and so on. Papers written from an operations management standpoint often include complaints that proposed investments in new technology are undervalued because insufficient attention is given to such changes in preparing financial appraisals. There is some corroborating evidence (Finnie and Sizer, 1983) relating to acquisitions of numerically controlled machines that very little effort was being made to evaluate the benefit of associated changes such as inventory reductions when preparing financial justifications. Methods of preparing such evaluations have since been suggested (Finnie and Sizer, 1984).

However, attention has also been drawn (Primrose *et al.*, 1984) to the possibility that some theoretically available anticipated benefits may not be immediately achievable because adjacent stages of the production process are unaffected by the new equipment and continue to operate as before. An improvement to a short stretch of a road often simply shifts the traffic problems a few miles further along. In much the same way the introduction of a highly sophisticated stage into an otherwise unreformed production system may greatly improve that stage but will not change the overall characteristics of the system so far as working capital requirements etc. are concerned. Where this is the case it would be unreasonable to expect the justification of the new equipment to include claims for savings which cannot be obtained under the conditions in force.

The benefits available from investment in new technology may also be under-represented if no account is taken of additional business that could be captured if the new equipment were available. Conversely business may be lost or prices may have to be reduced if only conventional equipment is installed due to the difficulty of competing with other firms utilising the advantages of new tech-

nology. There is no reason in principle to prevent the cash flows used in an appraisal of conventional versus new technology from reflecting expected differences in the volume of demand, and also if appropriate in the achievable selling prices, for one option as opposed to the other, provided estimates of these effects are made available to the person preparing the appraisal of the proposed expenditure.

The appraisal of particular capital expenditure proposals may be deficient if insufficient attention has been given to these matters. Such difficulties are avoidable given willingness by project sponsors to take the necessary pains. The principle of conducting a financial appraisal is not damaged by them, although they suggest points that financial analysts should take care to explore. The recent upsurge of complaints about financial appraisals suggests that many operations managers may be unconvinced that enough attention is being given to such points in practice.

The suggestion made by some advocates of 'strategic review' that proposals to invest in new technology are unsuitable for treatment as 'stand alone' projects oversimplifies the case. Three possibilities can be considered. The first is that introduction of the new equipment may have to be justified by demonstrable savings because it is an isolated purchase. The second is that the new equipment is being bought for evaluation and to gain experience in its use. If this is so then the case to obtain authority to buy the equipment should be argued on that basis with any demonstrable savings that may arise from its use being offered as an incidental attraction rather than as the main justification. Thirdly the proposed acquisition may be one stage in a programme of re-equipping an entire section of the production system which will enable the potential benefits of reduced working capital and so on to be fully achieved. If this is the case then recognition should be sought and justification should be shown for the programme as a whole. After that, authority can be sought for the purchase of the individual items of equipment on the basis of their role in the programme. A way round some of the reported difficulties may thus be more careful attention to the definition of projects, distinguishing genuine 'stand alone' proposals which must be justified upon comparative advantage from those which are really part of a larger programme and from those whose main justification is the imputed value of gaining first-hand experience with operating unfamiliar equipment.

(b) Information is uncertain or unquantifiable. Well documented formal techniques exist for handling information which is subject to considerable uncertainty (see for example Samuels and Wilkes 1986, chapters 16 and 17). An alternative and simpler approach is possible. The readily

identifiable benefits can be evaluated, and management can then be invited to place a value on the more intangible characteristics. Suppose for example that a particular proposal requires a present value of £10 million and readily demonstrable savings have a present value of £8.5 million. Management could be invited to decide whether they consider the more intangible benefits are worth at least £1.5 million. This approach could readily gain the advantages ascribed to Japanese-style consensus decision making when dealing with the evaluation of these more intangible benefits.

(c) Spurious justifications have to be fabricated. At least one paper (Senker, 1984) mentions the use of contrived and spurious figures to generate 'expected' financial benefits sufficient to secure acceptance of projects. It is possible to envisage various explanations for the corruption of the process of management decision making which the deliberate use of spurious information indicates. Whatever the correct explanation, it is difficult to see the existence of this malpractice as a good argument against financial appraisal.

Financial Appraisal Using DCF Imposes a Short-Term Decision Horizon

It is claimed by some authors that the discounting calculations employed in computing net present values or internal rates of return for capital investment proposals automatically bias investment appraisals against long-term projects. The present value of £1 due next year will always exceed the present value of £1 due further in the future for interest rates greater than zero. Thus the use of discounting must favour projects with rapid pay-offs over projects with deferred pay-offs and this effect will be aggravated where high hurdle rates are set.

The level of hurdle rates set by USA firms has been criticised (Hayes and Garvin, 1982). A reappraisal of the approach to project evaluation in industry is called for (Collis, 1986) to avoid discrimination against projects with long-term benefits through the use of DCF.

The conceptual basis of the case for using discounted cash flows is long established. The criticism to be considered is that the effect of discounting is unduly to bias financial evaluations in favour of expenditures which promise a rapid pay-off and against expenditures with longer pay-offs such as many involving advanced technology. The devaluation of future cash flows which occurs with the use of discounting is undeniable but is only severe when high rates of discount are employed.

It has been observed (Hodder, 1986) that Japanese financial evaluations generally use quite a low rate to represent the cost of funds to be invested in a capital expenditure. This raises the question of whether the difficulty complained of

may not be due to the use of unduly high rates of discount, rather than the discounting procedure itself.

The discounting rate used to evaluate a proposed capital expenditure will normally represent management's assessment of their cost of capital with the possible addition of a premium for risk in the case of projects considered to merit this. Some evidence is available (Scapens and Sale, 1981) as to the rates of discount used in a sample of UK and USA companies. UK companies used rates varying between 5% and 32% with an average (in money terms) of 18.5%. Among the USA companies rates varied between 10% and 40% with an average (in money terms) of 17.1%. It is not made clear whether these rates are before or after taxes.

Where discount rates are expressed in money terms, i.e. including an allowance for expected inflation, there is a further technical trap. Unless project cash flows are similarly increased by the expected rate of inflation year by year the resulting NPV will be too small. Care is necessary to ensure that cash flow estimates assuming current prices, i.e. zero inflation, are not being evaluated against a discount rate which includes an allowance for expected inflation. This would be another possible reason for apparently well conceived capital expenditure proposals failing to meet financial criteria.

An appraisal is offered by Kaplan (1986) of the discount rates employed by USA companies and it is suggested that many of them appear to be significantly over-estimating their cost of capital and hence setting too high a hurdle rate.

One source of evidence about the cost of capital is the average rate of return secured by investors in the stock market. The measurement of this return for UK companies is discussed by Samuels (1986). It appears that on average the real rate of return after tax obtained on equities in the UK has been of the order of 7 per cent, provided the distorting effect of the market collapse in 1973 and 1974 is ignored. Thus to match the average return in the market the minimum rate of return required from a project of average risk by a company entirely financed by equity should be of the order of 7 per cent after tax in real terms. In money terms this required rate of return would be increased by the anticipated rate of inflation, currently say 3 per cent to 5 per cent depending upon which forecasts are believed, indicating after-tax hurdle rates in money terms of 10 per cent to 12 per cent. Since many companies in fact employ a proportion of debt finance which is cheaper than equity, the hurdle rates for projects of average risk in these geared companies should be somewhat less than those for projects entirely financed by equity, say 5 to 6 per cent in real terms and 8 to 9 per cent in money terms after tax. At current rates of corporation tax these would correspond to around 9 per cent in

real terms and 13 per cent in money terms before tax. These rates are considerably less than the reported average hurdle rate of 18.5% in money terms, though it must be observed that expectations of inflation may have been higher at the time when the Scapens and Sale survey was conducted.

Other views of the cost of capital are entirely possible. The above discussion of the rates of return earned by investors assumes that they expect the market to yield the same average rate of return in the future as it has in the recent past. If plausible arguments could be adduced to support the view that investors can and should expect the future average return on the market to be consistently greater than in the past then this would justify the use of hurdle rates which imply a cost of capital greater than the historic average return on the market. Companies may also base their cost of capital estimates upon their view of the future returns they would like to earn. Followers of this approach have to justify the rate they seek and in particular to show that they are not trying to extract a market return for unsystematic risk.

Given that the hurdle rates reported by Scapens and Sale were collected during the period for which the average return on equities in the market, as cited in Samuels, was around 7 per cent, there appear to be *prima facie* grounds for asking whether UK companies may be setting inappropriately high hurdle rates for evaluating capital expenditure proposals. However, as a concluding observation in the opposite direction, mention may be made of Tulloch and Maclellan (1986). Referring to the provision of venture capital for financing management buy-outs, admittedly a special and fairly high-risk activity, these authors state that institutions providing such finance expect annual returns of at least 35 per cent.

If unduly high hurdle rates are indeed being set their level may reflect the imposition by management of excessive risk premiums rather than any miscalculation of the average return expected by investors. The concluding section of the discussion notes a number of recent papers whose authors argue that the effect of certain management practices may be to promote an undesirably high level of risk aversion in decision makers.

Attitudes to Incentives and Risk Lead Managers to Adopt Short-term Horizons for Decision Making

A previously cited paper (New, 1985) suggests that UK managers suffer from a fear of failure. Most managers, it is argued, see themselves as being in their current jobs for a limited period. Visible failure in their current position will prevent further progression while visible success will guarantee onward movement. The result is decision making with a strong emphasis on short-term results and aversion to risk. Similar arguments in respect of US managers can be found in Hayes

and Abernathy (1980). Such views are also advanced in Sheridan (1986) where it is argued that most managers aim to maximise short-term profits, get promoted and leave the problems to a successor.

Performance-related remuneration of management is identified as another practice tending towards actions with visible short-term benefits (Pope, 1986). Given that managers do not expect long tenure of their current posts they are likely to prefer actions whose consequences will trigger bonuses in the immediate future.

Under this heading may also be noted:

- (a) a suggested correlation (Pike, 1985) between reliance upon the pay-back period and management attitudes which accord a low priority to the interests of shareholders, and
- (b) a suggestion (Kennedy and Sugden, 1986) that the increasing adoption of discounted cash flow techniques for financial appraisal of capital expenditure proposals reflects managers' need to deflect responsibility for risky decisions by showing that scientific methods have been used to support decision making.

The work referred to in this section suggests that, if investment in new manufacturing technology is indeed being thwarted by managers taking short-term and risk-averse views, then plausible explanations for these attitudes exist apart from defects in the financial appraisal process. It also suggests that rectification of defective methods of operating financial appraisals may involve more than further instruction in the correct use of techniques. The amount of the risk premium demanded of capital expenditures which are judged to be of above average risk and also the chosen basis of assessing the relative riskiness of proposed capital expenditures will reflect management attitudes to risk. If these attitudes are influenced by organisational factors predisposing managers towards very risk-averse postures, this may well manifest itself in an insistence upon high hurdle rates when assessing proposals for capital expenditure. The problem will only be fully resolved when the attitudes to risk can be changed. By the same token scrapping financial appraisal of proposed capital expenditures would not eliminate the practices predisposing managers towards risk aversion and a preference for short-term results. The effects of these attitudes could be expected to continue in other ways.

Summary and conclusions

Suggestions are being made that orthodox financial appraisal of proposed capital expenditures with the use of discounted cash flows is inappropriate where the acquisition of equipment

using advanced manufacturing technology is concerned. These widespread expressions of disquiet about the investment appraisal system as an obstacle to new investment cannot simply be dismissed.

A review of the substance of the criticisms establishes that they are not concerned with an attack on the economic principles underlying the use of discounted cash flows to measure the financial worth of a proposed capital expenditure. The criticisms mainly represent concern that, in many companies, proposed investments in new technology which appear to be eminently desirable nevertheless fail to pass the financial screening process or succeed only because sponsors deliberately falsify supporting information to contrive an acceptable financial outcome (Senker, 1984).

In the discussion it is shown that the effects complained of need not be seen as inevitable shortcomings of the financial evaluation of proposed capital expenditures in new technology. They are much more likely to represent shortcomings in the management of the investment appraisal process within companies. Specific attention was given to:

- (i) the value of the widespread discussion and probing of assumptions which forms a part of consensus decision making;
- (ii) the importance of reflecting in the cash flows imputed to a proposed capital expenditure the full range of consequences attributable to the adoption of new technology;
- (iii) the possible error if cash flow forecasts are made assuming current prices and then evaluated against a hurdle rate which includes a provision for future inflation; and
- (iv) the adverse consequences of using excessively high hurdle rates.

Finally it was noted that, so far as high risk aversion and undue preference by managers for short-term results lie at the heart of the problem, these can be related to factors outside the capital expenditure appraisal system and would not be cured by scrapping it.

The conclusion offered is that the logical case for the continued use of discounted cash flows to measure the financial worth of proposed capital expenditures is as strong as ever. However there seems to be a requirement for further research into the management of investment appraisal within companies to ascertain how far it is bedevilled by the possible difficulties suggested above. Well documented case studies showing the progress of proposals for investment in advanced manufacturing technology from their initial conception through the process of appraisal to the final decision (accept or reject) would be valuable, especially if a range of companies was covered. Information is also needed about the way in which company

decision makers arrive at the hurdle rates they use for appraising capital expenditure proposals.

There would also appear to be scope for an educational effort to promote better understanding and wider use of existing knowledge about methods of conducting capital expenditure appraisal. This would need to be directed both at accountants and at managers.

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THE ACCOUNTING HISTORIANS JOURNAL

Semiannual Publication of The Academy of Accounting Historians

Volume 14, Number 2

Fall 1987

*Editors: Gary J. Previts, Manuscripts Editor, Case Western Reserve University
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Share Tipsters and Fair Advertising

Simon M. Keane

Abstract—The paper considers the concept of 'fairness' as it applies to the advertisements of investment advisers. In the light of the empirical evidence relating to the performance of investment tipsters and fund managers, it is argued that current advertising practices tend to raise investors' expectations to unrealistic levels. Possible changes to advertising practice regulations are considered.

Introduction

Investor protection is an issue of continuing concern in the US and in the UK. One particular relationship which exposes investors to risk, however, has received limited attention in either country, namely investors' relationship with investment tipsters—investment advisers who profess to have the skill to add value to investors' portfolio wealth. The issue has been highlighted recently in the UK by the Financial Services Act 1986 which, *inter alia*, requires all investment advisers to show 'due skill' in the services they provide and to be 'fair' in advertising their skill. The purpose of this paper is to consider the concept of investment skill in relation to the problem of determining what constitutes fair advertising by investment advisers.

The issue of investor protection arises in the context of investors' relations with three distinct groups: the management of the companies whose shares they own; fellow investors with access to privileged information; and investment intermediaries who manage or offer advice on investment strategies. The controls regulating the first two groups are well recognised and currently receive considerable attention by market participants and investor protection agencies. These include the audit function, financial disclosure regulations, the managerial labour market, security dealing restrictions, electronic monitoring procedures etc. Less clear are the protection needs of investors *vis-à-vis* the investment intermediary, at least in relation to the latter's claims to be able to transmit commercially valuable share recommendations.

Investment intermediaries offer a number of services including tailoring portfolios to meet consumption preferences and individual taxation circumstances. The service of concern in this paper is the ability to identify mispriced securities and to transmit strategy recommendations to investors before they lose their economic value. Attention by investor protection agencies in this respect has

tended to focus principally on advisers' honesty and independence. Little attention has been directed to the reasonableness of their basic claim, the ability to select superior investments.

What constitutes share selection skill depends ultimately on the mispricing opportunities presented by the market. A number of views are possible about the market's efficiency in setting prices, each with distinct implications for investment policy decisions. However, for the purposes of analysing the nature of investment skill it is useful to posit only two fundamental belief systems about market price behaviour. The first, a product of impressionistic experience and anecdotal evidence, appears to form the prevailing view. Although it embraces several different investment philosophies, underlying the traditional system is a set of common assumptions which in practice are given near-axiomatic status:

Belief System 1

1. Security prices are affected by the decisions of both naive and sophisticated investors, and tend consequently to represent a mediocre estimate of value.

2. It is a reasonable assumption that any reputable professional analyst can systematically identify materially mispriced securities.

3. When professional advisers communicate their recommendations to clients the market reaction will normally be slow enough for the recommendations to have commercial value.

4. Following professional advice can normally be expected to produce returns significantly in excess of those from a random selection strategy, and sufficient to cover all advisory fees, transaction costs, bid-ask spreads, etc.

The second belief system is the outcome of numerous research studies carried out and published over several decades, which have subjected professional investment performance to rigorous

Figure 1
Degrees of Market Efficiency

1	2	3	4
Perfectly Efficient	Near Perfectly Efficient	Moderately Inefficient	Grossly Inefficient
no superior returns even to experts	inefficiencies perceptible only to a few experts but nontransmissible to others	inefficiencies perceptible to 'qualified' analysts and transmissible to lay investors	inefficiencies apparent even to informed lay investors

testing and analysis.¹ Although the efficient market literature has recently been characterised by some conflicting findings,² it is nevertheless possible to postulate with confidence a number of conclusions that are consistent with the general body of empirical evidence, old and new. These form the fundamental basis of the second belief system:

Belief System 2

1. Without access to inside information, it is supremely difficult, even for professional investors, to achieve a superior performance other than by chance.

2. Where superior investment skill does exist the average excess return can be expected to be very modest.

3. It is supremely difficult for investors to identify which of the many investment advisory services in existence at any given time genuinely possesses superior investment skill.

4. It is a reasonable expectation that the market will react rapidly to published recommendations containing new information and hence diminish or eliminate their commercial value.

It is not intended here to review the evidence supporting the tenets of Belief System 2, but two research studies with particular relevance deserve to be noted. In the first,³ a meta-survey of performance-evaluation tests, it was estimated that, for nearly 50,000 recommendations provided by 200 advisory services over a 50 year period, the average gain to investors before costs was only about 2% if they acted the day after publication, and was in total insufficient to cover the expenses of a 'round trip'. These of course were average results, but the indications are that the performance of even the largest and most prestigious

of advisory services, such as Value Line in the United States, has on average very modest implications for investors. In a recent study⁴ it was found that, although Value Line recommendations were superior to a random selection and provided limited opportunities for net gains to investors, the gains were insufficient, after trading costs, to justify a pure active strategy.

It must be stressed that each of the two sets of precepts above represents a minimalistic view of the particular belief system. Some proponents of the traditional system would argue that there are more substantial and accessible rewards for investment skill than those implied above. Some proponents of the research based perspective would argue that no significant opportunity exists at all for exercising commercially significant investment skill. Few, however, could argue that each set of statements represents other than a conservative expression of the particular investment school.

Although efficient markets theory remains a controversial issue, it must be stressed that the debate tends misleadingly to be characterised as a simple true or false issue, when in practice the market's pricing efficiency is essentially a matter of degree. The relevant issue is not between two extreme states—a world where no investor, including the expert analyst, has even moderate investment skill and a world where many investors have significant levels of skill. Rather it is about whether the ordinary investor can realistically expect to identify investment advisers with the skill to recommend securities which will on average earn significant abnormal returns. Whether or not the market can be deemed to be efficient in an absolute sense, the empirical evidence overwhelmingly rejects a degree of (in)efficiency significantly to the right of point 2 on the efficiency scale in figure 1. Issues such as those raised by Shiller⁵ (the apparently excessive volatility of stock

¹E.g. see Williamson, J., 'Measuring Mutual Fund Performance', *Financial Analysts Journal* (Nov/Dec 1972), and for other references see S. Ferris and D. Chance 'The Effect of 12b-1 Places on Mutual Fund Expense Ratios: A Note', *Journal of Finance* (September, 1987).

²See Keane S. M., *Stock Market Efficiency*, Philip Allan, 1983.

³Dimson, E. and P. Marsh, 'An Analysis of Brokers' and Analysts' Unpublished Forecasts of UK Stock Returns', *Journal of Finance* (Vol. 39, 1984).

⁴Copeland, T. and D. Mayers, 'The Value Line Enigma (1965-1978)', *Journal of Financial Economics* (November, 1982).

⁵Shiller, R., 'Do Stock Prices Move Too Much to be Justified by Subsequent Changes in Dividends?', *American Economic Review* (June, 1981).

prices relative to share dividend streams), Summers⁶ (the possibility that persistent long-term irrationalities exist in the market but are undetectable using current research models), and Grossman and Stiglitz⁷ (the need for some measure of inefficiency to give experts an incentive to process information) all imply a locus on the efficiency spectrum to the right of point 1 but provide little support for assuming a position significantly beyond point 2.

The tenets of Belief System 2 have been framed therefore to reflect the conclusion that the abnormal return opportunities available to the ordinary investor operating directly or on the advice of the share tipster are in practice severely limited. Share selection advice, of course, is frequently 'effective' in the sense that it is often associated with substantial gains which more than cover the related fees. The fact, however, that, on average, investment advice fails to generate superior performance, and that stocks chosen randomly can frequently provide equally substantial gains implies that the benefits to the advisee and the worthwhileness of the fees are for the main part illusory.

It is clearly one of the paradoxes of the market that most investors appear to subscribe to Belief System 1, when the evidence indicates that market prices correspond to Belief System 2. This raises questions as to what investors must believe, and how they must behave for the market to maintain its efficiency, an issue which will be addressed subsequently.

Investment strategy and the need for protection

Corresponding to these two belief systems, investment activity can be dichotomised in terms of one of two fundamental strategies. Active investment, which is the logical concomitant of Belief System 1, consists essentially of buying a portfolio with restricted diversification, and of actively switching between securities. Passive investment, the benchmark strategy for Belief System 2, consists of purchasing a well-diversified portfolio broadly representative of the world market of equity securities, and of transacting as little as possible except for portfolio rebalancing purposes. Maximum diversification and minimum operating costs are the key elements.

Under Belief System 1, the fundamental issue facing investors is to identify a successful strategy from the many on offer at any given time. Seeking

professional advice to discriminate between shares is perceived to be not only reasonable but the mark of responsible investment. The benchmark or reference base for judging professional investment skill is the return capable of being generated by the reasonably competent adviser. Under Belief System 2, by contrast, the fundamental issue is whether or not to accept market prices at face value. The benchmark for judging the existence of skill is the ability to exceed the return on a suitable market index after making due allowance for risk etc.

The optimal degree of protection needed by investors is substantially dependent on their investment strategy, which in turn is largely shaped by the particular belief system to which they subscribe. Thus, at the extreme, an investor who holds the shares of only one company is considerably more exposed to the effects of adverse corporate management behaviour than a holder of an internationally diversified portfolio. Again, an active trader in securities is likely to be more sensitive to the inequity of insider dealing than a passive, long-term investor. Again, an investor who physically transfers his funds to an investment adviser is exposed to considerably more risk than an investor who merely takes advice. Diversification, of course, cannot eliminate systematic attempts by corporate managers generally to subordinate shareholders' interests to their own, any more than pursuing a passive investment strategy can extinguish investors' repugnance for insider-dealing activities. All investors, whatever portfolio position they adopt, stand to benefit from some measure of protection. But the needs of a holder of a world-wide portfolio of equities are of a different order from those of an investor who engages in individual trades in pursuit of abnormal returns. It is arguable, therefore, that the hazard from which investors may need most protection is having a false perception of abnormal-return opportunities, and of professional investors' skill in identifying them, as characterised by Belief System 1.

Investment skill

The opportunity to exhibit investment skill extends to a number of financial activities apart from making buy-sell recommendations, but it is the latter which is the focus of the present paper. A share is the potential subject of a buy-sell recommendation if its market price fails to reflect the company's economic potential. The exercise of investment skill, therefore, involves two considerations: assessing the future potential of the company and judging whether the present value of that potential is reflected in the share price. Where divergence occurs, an abnormal investment opportunity exists. Any reasonably competent analyst

⁶Summers, L., 'Does the Stock Market Rationally Reflect Fundamental Values?', *Journal of Finance* (July, 1986).

⁷Grossman, S. and J. Stiglitz, 'On the Impossibility of Informationally Efficient Markets', *American Economic Review* (June, 1980).

can be assumed to have sufficient skill to make informed judgments about a company's economic potential. The more difficult task is to determine to what extent the present value of this economic potential fails to be reflected in the share price. Investment skill, therefore, consists of the ability systematically to identify disparity between price and economic potential taking into account relevant risk characteristics. It has operational significance only if the observed divergence is large enough to cover transaction costs and if the chance element in the investment outcome is clearly distinguishable from the skill element.

The evidence suggests that, in practice, investment skill in this sense is very rare, and that, where it exists, the incremental rewards are modest. If the nature of investment skill under Belief System 2 can be placed in perspective, it may be characterised loosely as the ability systematically to pick 'fifty-two or more winners out of a hundred', i.e. enough to generate returns in excess of those needed to cover the incremental costs and risks of pursuing a representative sample of the adviser's recommendations. Since investment skill cannot eliminate random and unforeseeable events, it is not inconsistent with the existence of skill that an adviser may at times recommend securities that prove subsequently to be worthless. Therefore, just as it is impossible to establish the existence of investment skill without reviewing large numbers of investment observations, so it is impossible to establish its absence from the outcome of a single or a small number of investment recommendations. It follows that the investment adviser's duty 'to demonstrate skill' in selecting individual shares has little operational significance in terms of his investment performance with any individual advisee.

Fairness

It is possible now to consider the concept of fairness in the context of advertising investment skill. It is a matter of speculation, and outside the scope of this paper, as to which of the two market belief systems would be adopted by the courts in interpreting fairness for the purposes of implementing the Financial Services Act. Fairness is considered here, however, not as a judicial concept but as a benchmark by which agencies such as the Advertising Standards Board can determine good advertising practice in the investment advisory industry. For this purpose it is assumed that the appropriate interpretation of fairness is one consonant with the best empirical evidence available.

For an advertisement to be fair it is not sufficient that the facts described are accurate. For example, if the investment tipster advertises that in the past he recommended a share at £20 which within a month rose to £80, it is important that the

facts be accurate, but this is not enough to make the advertisement fair. An advertisement is fair only if it is representative, that is if it unambiguously reflects the returns investors can *expect* to achieve: not the returns that *might* be achieved (the tail of a probability distribution) but the returns that can reasonably be expected to be earned systematically over the long term (the mean of the probability distribution). Under the essentially impressionistic Belief System 1 there is no reliable benchmark for specifying what can reasonably be expected. The conventional wisdom of the market credits the professional analyst with a significant (albeit indeterminate) level of skill. Hence, an advertisement is assumed to be fair if its claims are not patently outrageous.

Under Belief System 2, however, the benchmark is rooted in the results of empirical tests. No amount of investment experience or expert judgment can provide an adequate substitute for such tests. An expected return, therefore, is one which is consistent with the findings of methodologically accepted research procedures. If the skills of a particular tipster have not been individually tested, then it is a reasonable assumption that he cannot generate returns significantly above the average achievable by tipsters who have been tested. In effect, the onus rests with the individual expert to establish the existence of his skill. It follows that any advertisement which gives the impression that a particular advisory service is capable of generating returns after costs significantly above those of a purely passive strategy can be assumed to be unfair unless its claims can be supported by the testimony of a rigorous performance evaluation test. Indeed, the advertisement is unfair even when the investment skill it proclaims has been properly attested if it fails to signal the likelihood that the market price of the securities will adjust before the investor can derive commercial value from such recommendations.

Moderating investors' expectations

The pricing efficiency of the market is a counter-intuitive notion, and it is difficult to conceive of any method by which investors' expectations can be made more realistic other than by the investors becoming explicitly aware of the insights of market research studies. One possibility is to make it mandatory for advisory services to submit to an independent performance evaluation service. However, this presents its own problems. Performance evaluation techniques currently used by professionally managed funds are often seriously flawed, and it is possible that imperfect testing procedures may give a false degree of confidence in the test results. In addition, recently formed advisory services will tend to be deficient in data and, indeed, no firm's past record may be relevant to its

Table 1
Warning Note

All equity securities are risky but some of the risk can be avoided by diversification. Empirical tests have shown that:

- * Very few professional analysts are able, except by chance or with inside information, to identify shares which are likely to earn abnormal returns in relation to their level of risk.
- * If an analyst has been shown to possess share-selection skill, share prices will tend to adjust to his recommendations before investors can take advantage of them.
- * Holding a well-diversified portfolio and engaging in as few transfers between shares as possible is likely in the long run to be the most profitable strategy for the majority of investors.

future performance if there has been a change of key personnel.

A second possibility is to make it mandatory for any advertisement containing a sample of the adviser's investment record to include a 'balancing statistic'. An explicit comparison with the market return might provide a benchmark for assessing the returns reported in the advertisement, but over short time periods this would be misleading since it would fail to indicate the adviser's capacity to generate superior returns systematically. Therefore, on the assumption that an investment adviser will tend to emphasise investment decisions having a better than average outcome, it might help to offset this bias if it were mandatory to publish an example of the adviser's investment decisions which has a correspondingly lower than average outcome. The approach, however, is limited by the fact that it fails to indicate the probabilities of the respective outcomes, and the intuitively-based belief system will tend to sustain the presumption that, because of the adviser's professional status, the more favourable outcome is more likely.

A third possibility, and one which is presented here as an ideal, is to make it mandatory for all advertisements of investment intermediaries to include a note as in Table 1 indicating the investment returns an investor can realistically expect consistent with the accumulated research evidence. Advisory firms frequently include a note indicating that shares 'can go down as well as up', but this is no more than a warning about the nature of equity relative to certain classes of fixed interest investment. It reveals nothing about the capacity of the advisory service to distinguish those securities which are more likely to go up than down.

It may seem unrealistic to expect investment advisers to communicate information which undermines their credibility instead of allowing the investment community to institute some alternative system of self-education. A positive disclosure procedure, however, can be defended on two grounds: (a) the relevant insights can be derived only as a result of statistical research and it is unrealistic to expect investors directly to seek out

the source literature, and (b) investments advisers benefit most from the unrealistic level of expectations characteristic of Belief System 2, and the very existence of their 'tipster' services helps sustain that level.

The case for intervention

Why should the investment advisory industry have to conform to such a severe advertising code compared to other services and products? In an environment dominated by Belief System 1 it is widely assumed that the general principles of good advertising—that it 'should be legal, decent, honest and truthful'—are sufficient to govern the investment industry no less than other services and products. A moderate degree of advertising hyperbole is generally viewed as acceptable on the assumption that the reasonably discerning consumer will make due allowance for the advertiser's claims, as he does for other products. However, if the evidence underlying Belief System 2 is valid, then making due allowance for exaggerated investment skills is unlikely to be sufficient to give investors the perspective of the research findings. Investment selection advice is a service with unique characteristics which distinguish it from most other advertised services. Unlike the medical practitioner and other professionals, the investment tipster can provide no certificate of professional qualification that offers an assurance of even a minimum level of skill in relation to his basic service. Unlike the second-hand car market etc, customers cannot ask for or expect to receive a guarantee of the product being offered, i.e. a superior performance. And, like the tobacco industry, the necessary insights can only be gained with the help of rigorous independent research. Given that the economic consequences of ineffectual investment advice can be significant, and because of the problems faced by investors in conducting their own independent tests for each adviser, they have no alternative means of securing realistic expectations of professional stock-selection capabilities except through

the vicarious evidence of the performance evaluation literature.

In conclusion, intervention in the advertising practices of investment tipsters is desirable primarily because of the fundamentally counter-intuitive nature of the empirical findings and because the dominance of the conventional belief system tends to ascribe, to those who hold themselves out as having superior investment skills, powers which in practice are without foundation.

Can market efficiency survive the reduced investment activity?

The publication of a warning note intended to moderate investors' expectations about the rewards of active investment is likely to meet with resistance on a number of grounds: (1) 'the associated evidence is inconclusive', (2) 'the evidence is already too well known for any campaign to be necessary', and (3) 'a reduction in investment activity might adversely affect the market's pricing mechanism'.

As for the first, it has already been stressed that the inconclusive aspect of the evidence relates only to how far to the left of the mid-point on the efficiency scale (Figure 1) the market's pricing mechanism can be assumed to lie. The evidence overwhelmingly rejects a locus significantly to the right of that point. As for the second, both experience and empirical tests indicate that the efficient market literature is not widely known or understood.⁸ The significant issue, therefore, is whether the benefits of investors becoming generally better informed about the market are outweighed by the possible implications for the continued efficiency of the market's pricing mechanism.

Little is known in practice about the process by which information becomes impounded in share prices, and it is possible to argue that the market's current degree of efficiency depends on most investors remaining ignorant of the evidence for its efficiency, with the level of active investment currently generated by investment advisory services being essential to the continuing efficiency of the market. The fact is, however, that we do not know. It is equally possible that stock prices in practice are established by the activities of a relatively small number of very skilled professional traders and that the activities of less sophisticated investors for the main part cancel one another out. Skilled information processors, of course, need an incentive to perform their function but they do not need to be fooled by or kept ignorant of the evidence about market efficiency. The significance of 'near

perfect' efficiency, point 2 on the efficiency scale, is that it is possible for these experts to earn arbitrage returns commensurate with their skill and efforts whilst recognising that the returns are generally too modest and transient to be transmittable to the ordinary investor.

The issue, therefore, is whether the possibility that those who actively follow professional tipsters might contribute to the efficiency of the pricing process makes it desirable that the insights of market research studies should be deliberately withheld from them simply to sustain a certain level of investment activity. Given the costs of information collection and analysis, it is of course inconceivable that the market could be perfectly efficient (point 1 on the scale) without a significant body of sophisticated information processors believing otherwise. But it is difficult to accept that near perfect efficiency depends for its existence on the general mass of investors being deliberately kept uninformed of the evidence supporting its efficiency. If any decline in pricing efficiency results from the promotion of passive investment strategies, it is reasonable to assume in a competitive market that the number of professional traders and the level of their activity will adapt to exploit the resultant opportunities, and so contain the degree of inefficiency.

It is significant that awareness of the research findings appears to be substantially greater in the US than in the UK, as evidenced by the relatively greater growth there of Index Fund investment. For example, there are at least two large Mutual Index Funds in the US but no comparable Unit Trust in the UK. Pension fund managers in the US have for many years made significant use of passive investment strategies compared to a relatively recent and modest involvement by the UK pension fund industry. There are, however, no grounds for believing that US markets as a result have become relatively less efficient than UK and other markets. It is reasonable to assume that one of the properties of an efficient market is that it has sufficient resilience to attract and reward the additional professional information processing activity needed to fill the void created by any increase in passivity by the nonprofessional investment community.

Finally, it must be said that, whatever the consequences of informing investors generally about the essential insights of the research evidence and whether or not market efficiency can be maintained by the activities of a relatively small number of professional analysts, it seems perverse to argue that ignorance and illusion about the effectiveness of share tipster advice should be sustained simply to avoid the possibility of creating the kind of market conditions which would in fact justify the share tipster's role. In the unlikely event that these conditions would result from wider dissemination

⁸Mayer-Sommer, A. P., 'Understanding and Acceptance of the Efficient Markets Hypothesis and its Accounting Implications', *Accounting Review* (January, 1979).

of the research findings, it is arguable that a world where some experts are presented with the opportunity to exercise and sell their investment skill, and are able rigorously to demonstrate to an informed investment public the existence of that skill, is preferable to a world where stock prices preclude the opportunities for superior investment only by virtue of investors' ignorance.

Summary and conclusion

A high proportion of investor-protection activity is currently devoted to regulating management-shareholder relationships and the exploits of insider dealers. It is, however, one of the important insights of modern portfolio theory that much of the risk associated with the former is capable of being diversified away, and that passive portfolio holders are unlikely to suffer material loss from the latter⁹ other than to be offended by a sense of injustice. There is, nonetheless, one significant hazard which exposes investors to a substantial need for protection, and against which existing mechanisms offer limited protection, namely placing an undue amount of trust in the efficacy of professional investment tipster services, and failing to recognise the benefits of passive, international diversification. The significant disparity between intuitively based and empirically based beliefs about the market's abnormal return opportunities makes it evident that a major proportion of the investment community suffers from a massive investment illusion. It is not lack of investment skill from which investors need protection, but the consequences of imputing skill where it does not

exist. When investment skill is perceived to be a rare phenomenon, the appropriate investment strategy is clear. When it is assumed to exist where it is absent, the costs to the investor can be significant.

The benefits of creating more realistic expectations about investment opportunities extend beyond the direct impact on investors' portfolio returns. The problem of corporate short-termism, to the extent that it is a problem of substance, can be assumed to be rooted in unrealistic investor expectations. It is because of such expectations that continuous pressure is exerted on professional fund managers to produce superior investment results, and that they in turn exert pressure on corporate management to concentrate their efforts on the kind of short-term decision criteria that are assumed to promote these results. Although the evidence indicates that the market itself does not suffer from myopia in setting security prices, this does not protect individual investors from myopia, or inhibit them from encouraging corporate decision-makers to take a short-term perspective.

If investors are to secure a realistic insight into the limitations of professional investment skill, there is no effective alternative other than for them to be systematically exposed to the fundamental insights of the market research literature. Although the author is well aware that in practice many reasons will be found to resist the proposal, it is presented here as an ideal that a more effective investment decision-taking environment would result if those who do most to perpetuate the myth that superior earning power can readily be 'bought', and who stand to benefit most from ignorance of the research literature, should be required to communicate the essence of that literature to investors. The notion that for market efficiency at the 'near perfect' degree to be sustained investors must be kept ignorant of its efficiency is both ethically and empirically insupportable.

⁹It is arguable that insiders provide an effective vehicle for impounding information into share prices and therefore enhance the allocatory efficiency of the market, thereby benefiting holders of the market portfolio.

Financial Accountability & Management

Winter 1987

Editor: John Perrin

Vol. 3 No. 4

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The Role of Payback in the Investment Process

Robert Kee and Bruce Bublitz

Abstract—This study examines the use of the payback (PB) method as a means of evaluating a proposed asset's risk and its joint application with profit-oriented capital budgeting models. Previous research studies indicating a linkage between the PB method and risk analysis are reviewed. A certainty-equivalent model is used to demonstrate this relationship and the properties of the relationship exploited by PB when used as a heuristic. Results of the analysis indicate that using a hurdle PB as a filter for identifying proposals with acceptable risk and return attributes is consistent with more quantitatively oriented investment techniques under certain conditions. The study then examines the conceptual relationship between PB and profit-oriented capital budgeting models. Results suggest that PB and profit-oriented capital budgeting techniques measure different attributes of an investment and complement one another in describing and analysing its cash flows.

Introduction

Despite condemnation in the academic literature, the payback (PB) method continues to be one of the most widely applied quantitative techniques utilised in investment decisions (Klammer, 1972; Fremgen, 1973; Bavishi, 1981). This conflict between financial theory (the prescription to avoid PB) and capital budgeting practice (the frequent application of PB) has led to numerous studies evaluating PB's usefulness as an investment technique.

It is useful to classify these studies into two groups: those which examine PB as the principal means of investment evaluation, and those which examine its use as a supplementary criterion. The first group includes studies by Gordon (1955), Mephram (1975), and Hoskins and Mumey (1979); the focus of these and related studies was on the ability of PB to measure or approximate the profitability of an investment. The second group includes studies by Weingartner (1969) and Statman (1982). As noted by Weingartner, PB is frequently employed as one of many potential constraints that a proposed asset must meet in order to be approved for investment. Accordingly, the focus of these studies was on the ability of PB to approximate an investment's non-profit attributes, such as risk, liquidity, and likely impact upon measures of management performance. Additional applications proposed to explain PB's popularity include its use as a means of resolving capital rationing and owner manager conflict (Pike, 1983b, 1985).

Surveys of investment practice indicate that PB is seldom used as a primary investment technique, but rather is employed as a secondary technique to supplement information provided by profit-oriented capital budgeting models such as net present value (NPV), internal rate of return (IRR), and accounting rate of return (ARR). Across investment surveys, PB is the most frequently used

secondary technique (Gitman and Forrester, 1977) and in one survey it was employed more frequently in this capacity than all other models combined (Kim and Farragher, 1981). The supplementary role suggested by Weingartner and Statman, therefore, appears to offer the most fruitful avenue for evaluating PB's usefulness as an investment model. However, neither author demonstrated how PB is specifically related to an asset's non-profit attributes such as risk or liquidity. Furthermore, because PB is used to supplement other investment models, any discussion of PB is incomplete and potentially misleading without an examination of its relationship and joint application with profit-oriented capital budgeting techniques. However, this aspect of PB has largely been ignored in the investment and accounting literature.

Heuristics, such as PB, seldom have a well-defined conceptual relationship with an event that they are employed to evaluate. Rather, a heuristic exploits a property of an event, in a rule-of-thumb format, that is not always apparent from examining the heuristics. The next section of the paper reviews previous studies indicating a potential linkage between PB and risk. A certainty-equivalent model is then used to demonstrate this linkage as well as properties of the relationship exploited by PB when used as a heuristic. The subsequent section evaluates the complementary relationship between PB and profit-oriented capital budgeting models and then examines their joint application. The final section summarises the paper.

Any attempt to explain the continued use of PB could be viewed as a justification for its *continued* use. Our purpose is the opposite—to advance our understanding of the uses and limitations of PB as an investment model. As noted by Miller (1977, pp. 272–273), heuristics such as PB survive either because they are compatible with market equilibrium, however irrational they may appear when

examined closely and in isolation, or because they are neutral in that they neither serve a function nor do any harm. Examining the uses and limitations of PB and its relationship to other investment models may aid in explaining why PB survives. Equally important, it may enhance our knowledge of the investment process and thereby stimulate the development of alternative models and techniques that mitigate the need for heuristics such as PB.

Payback and uncertainty

Many of the applications of PB cited by Weingartner and Statman relate to investment decisions made in an environment of uncertainty.¹ In this environment PB is itself a stochastic variable. Traditionally PB has been calculated as follows:

$$\sum_{i=1}^t CF_i = INV_0 \quad (1)$$

where:

CF_i = expected cash flow in period i (assumed to be the expected value of a continuous probability distribution)

INV_0 = initial capital outlay

t = payback based on expected cash flows.

Risk analysis is one of the applications of PB frequently posited to explain its use (Weingartner, 1969). Surveys of investment practice provide evidence verifying this assertion. For example, in the Petty, Scott and Bird (1975) survey, PB was one of the models employed most frequently to evaluate risk. Further evidence of PB's usefulness as a means of assessing an asset's risk is provided by Sundem (1974, 1975) and Schall and Sundem (1980). In a study of the relative performance of capital budgeting models in a simulated investment environment, Sundem (1975) found that PB performed poorly in nearly certain environments. As uncertainty increased, however, PB's performance relative to other models improved substantially. In the higher risk environments simulated, PB outperformed a NPV model.² In a prior study,

Sundem (1974) had found that a NPV model with a PB constraint outperformed either model used individually. Results of the two studies support Weingartner's assertion that PB is useful for assessing risk and that PB may be useful as a constraint to other investment models. However, both studies are subject to the scepticism sometimes expressed concerning the relevance of simulation results, i.e., how well did the simulation reflect the environment of interest?

In a subsequent study, Schall and Sundem (1980) examined the relationship between a firm's use of an investment model(s) and its level of investment uncertainty as measured by the firm's beta. Across sampled firms, the authors found that the application of sophisticated capital budgeting techniques declined as uncertainty increased. Kim and Farragher (1981) used the coefficient of variation of a firm's return on assets as a measure of risk and arrived at similar conclusions. Theoretically, a firm's performance should improve with the adoption of sophisticated capital budgeting techniques, i.e., models that use discounted cash flows and explicitly evaluate risk. However, in a market study of firms that switched to sophisticated capital budgeting techniques, Haka, Gordon and Pinches (1985) were unable to conclude that switching to sophisticated techniques per se resulted in superior performance.

Petty, Scott and Bird (1975) and Sundem (1975) note that the application of PB is associated with an increase in risk over time. The standard explanation of PB's usefulness is that it ignores an asset's later and more risky cash flows and that it is perceived to provide a somewhat crude indication of risk. However, PB's frequent use in investment practice, combined with the results of the Sundem, Schall and Sundem, and Haka, Gordon and Pinches studies, suggest that more fundamental properties may be at work as well.

In practice, PB is used as a filter to evaluate a proposed asset's risk (Pike, 1983a; Schall, Sundem and Geijsbeek, 1978). If a proposed asset's PB, or t , is less than or equal to a 'hurdle PB', which will be designated as t^* , then the asset's expected return is perceived to be sufficient to compensate for its risk. The perceived uncertainty of an asset's future cash flows is reflected in the length of t^* . Corporate managers shorten t^* for high risk assets and lengthen it for those perceived to be less risky. Although the relationship between t^* and risk is somewhat intuitive, a theoretical relationship between the two variables may be demonstrated.

Determination of an asset's hurdle PB generally is a subjective assessment. Therefore, to illustrate the linkage between t^* and risk, its relationship to a capital budgeting model that explicitly incorporates risk will be evaluated. Surveys of corporate managers indicate that the risk-adjusted discount and certainty-equivalent models (CE) are the

¹Investment uncertainty may arise from stochastic variation in an asset's initial capital outlay, economic life or periodic cash flows. For assets purchased or constructed within a short period of time, random variation in an asset's initial capital outlay is probably minimal. The other two sources of investment risk are both reflected in the distribution of an asset's cash flows. Consequently, investment models that evaluate the distribution of an asset's cash flows may be used to assess risk that results from random variation in an asset's economic life, periodic cash flows, or both.

²The NPV, PB and four other capital budgeting models were used to select from 30 hypothetical assets. A valuation model was used to evaluate the portfolio of assets selected by each of the six investment models. In high-risk environments, the portfolio selected using PB had a higher value relative to the portfolio selected using a NPV model.

dominant quantitative techniques employed in practice to adjust for risk.³ The CE will be used in subsequent analysis due to its ability to accommodate a more general structure of risk resolution (Bar-Yosef and Mesznik, 1977). The present value of an asset under the CE model is computed as follows:

$$V = \sum_{i=1}^N \frac{\alpha_i CF_i}{(1+r_f)^i} \quad (2)$$

where:

- V = the present value of a riskless cash flow stream
- α_i = certainty equivalent per dollar of expected cash flow in period i
- r_f = risk-free interest rate
- N = economic life.

Alpha in equation 2 represents the ratio of an uncertain cash flow to that of a riskless cash flow between which a decision maker would be indifferent.⁴ It reflects both a decision maker's assessment of the uncertainty surrounding an asset's cash flows as well as his or her attitude towards risk.⁵ In effect, alpha converts an uncertain cash flow, through a decision maker's preference for risk and return, into an equivalent riskless cash flow.

³The risk-adjusted discount and the certainty-equivalent models are subject to criticism on several points. Robichek and Myers (1966) have shown that the risk-adjusted discount method requires that risk increases over time while Beedles (1978) has demonstrated that certainty-equivalent factors are not always valid indexes of an investment's risk. Both models also fail to incorporate the dependence of an asset's cash flows over time and its covariance with the cash flows of other investments. Although the capital asset pricing model overcomes these deficiencies, surveys of investment practice indicate it is seldom used. Consequently, we have limited our analysis to quantitative models that evaluate only a single project and are widely used in practice.

⁴Capital budgeting decisions are generally performed by managers whose preference functions may or may not be congruent with those of a firm's stockholders. However, management compensation and tenure policies place considerable pressure on managers to act in the firm's stockholders' best interest, i.e. make investment decisions congruent with stockholders' preference functions. For an analysis of compensation plans used to accomplish this objective, see, for example, Smith and Watts (1982). In the remainder of the paper we assume management incentive policies are sufficient to induce managers to make investment decisions congruent with the preference functions of the firm's stockholders.

⁵The relationship between alpha and risk is less than perfect. To exhibit a unique positive relationship with risk, Bar-Yosef and Mesznik (1977) indicate that alpha must lie within the range 0 to 1. As they demonstrate, however, alpha is not bounded by these values. For example, a negative expected cash flow will produce an alpha greater than one (see Bar-Yosef and Mesznik, 1977, p. 1731). As noted by Beedles (1978), alpha is dependent on all moments of an asset's cash flows while risk is traditionally defined as only the second moment. Throughout the paper we make the traditional assumption that alpha is bounded by 0 and 1 to maintain an unambiguous association between alpha and risk. While alpha may take on values outside this range, these occurrences are probably somewhat atypical in practice.

As noted by Petty, Scott and Bird and by Sundem, the application of PB is associated with an increase in risk over time. If a decision maker is risk-averse then an increase in risk over time will be reflected in a decreasing alpha series.⁶ Coefficients of this series are determined jointly from a decision maker's assessment of the uncertainty of each period's cash flow and his or her attitude toward risk.

To evaluate the relationship between an asset's PB, risk and CE, an alpha series that decreases over time at a decreasing rate will be used to approximate an asset's risk.⁷ A mathematical function that may be used to generate an alpha series that decreases at a decreasing rate and is tractable is an exponential decay model. Employing this function to generate alpha, equation 2 may be expressed as:

$$V = \sum_{i=1}^N \frac{\alpha_i^i CF_i}{(1+r_f)^i} \quad (3)$$

For an investment to be undertaken, V in equation 3 must be equal to or greater than the asset's initial capital outlay. Setting V equal to the initial investment (INV_0) and assuming uniform cash flows ($CF_i = CF_0$ for all i), equation 3 may be written:⁸

$$\frac{INV_0}{CF_0} = \sum_{i=1}^N \frac{\alpha_1^i}{(1+r_f)^i} \quad (4)$$

Summing the right-hand side of equation 4 and setting INV_0/CF_0 to t^* we have:

$$t^* = \frac{\alpha_1}{1+r_f-\alpha_1} \left[1 - \frac{\alpha_1^N}{(1+r_f)^N} \right] \quad (5)$$

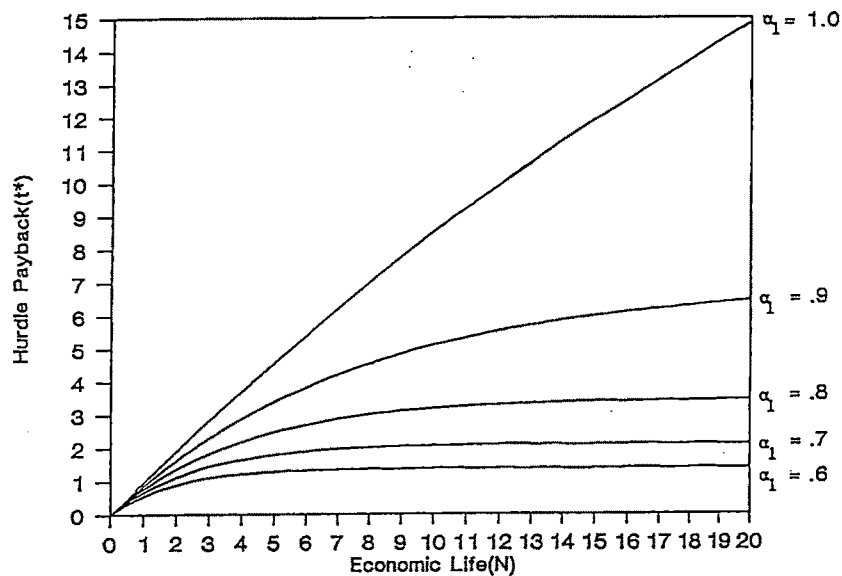
From equation 5 several observations concerning the relationship between an asset's risk and hurdle PB can be made. First, as the economic life of an asset increases, t^* approaches $\alpha_1/(1+r_f-\alpha_1)$ as an upper limit. Second, as the risk of a proposed asset increases—i.e., alpha values get smaller— t^* approaches its maximum value more quickly for a given N . Third, for assets with extremely high levels of risk, t^* begins to approach zero. Finally, for an asset with no risk and a relatively long

⁶If the variance of an asset's cash flows increases with respect to time, while a decision maker's risk preferences are held constant, successive unit cash flows will each have a lower certainty equivalent. Alpha, the ratio of an uncertain cash flow to its certainty equivalent, will decrease.

⁷Our selection of a series that decreases at a decreasing rate represents the most conservative manner in which an increase in risk would be reflected in an alpha series. Since PB would perform best as a risk proxy when risk increases at an increasing rate, we are also being conservative in illustrating the potential usefulness of PB.

⁸For many investments, expected cost savings or revenues are relatively constant from year to year. If an asset has a non-uniform but systematic cash flow pattern, equation 2 can still be used to derive an expression for t^* .

Figure 1
Hurdle Payback as a Function of an Asset's Economic Life and Risk



The assumed risk free rate is 3%

$$t^* = \frac{\alpha_1}{(1 + r_f - \alpha_1)} \left[1 - \frac{\alpha_1^N}{(1 + r_f)^N} \right]$$

economic life, t^* is equivalent to the reciprocal of the risk-free interest rate.

The relationship between an asset's economic life, risk and hurdle payback is illustrated in Figure 1. The horizontal and vertical axes of the graph represent the economic life of an asset (N) and its hurdle PB (t^*), respectively. Each of the five curves depicted in Figure 1 represents the set of hurdle PBs required for an asset with an economic life varying from zero to twenty years and with the risk level indicated at the right of the graph. The risk-free discount rate applied in all cases was 3%. For example, an asset with an economic life of 10 years and $\alpha_1 = 1$, the topmost curve in Figure 1, has a hurdle PB of slightly over 8 years; had the asset's initial alpha been 0.9, its hurdle PB would have been approximately 5.1 years.

As illustrated in Figure 1, t^* is a convex function with respect to N , i.e., t^* increases over time but at a decreasing rate. The differences across the five curves in Figure 1 illustrate the impact of risk upon t^* . For a risk free asset, $\alpha_1 = 1$, t^* is determined almost exclusively by the length of its economic life. However, as risk increases the convexity of t^* increases and the length of an asset's economic life plays a less significant role in determining t^* . For the higher risk levels depicted, t^* begins to approach a maximum value, i.e., the graph of t^* becomes flat. At its maximum value, an asset's hurdle PB is independent of its economic life.

Equation 5 was developed with the assumption that alpha decreased over time at a decreasing rate. However, our conclusions hold true also for assets whose risk would be reflected in alpha series that decrease at a constant or increasing rate. The hurdle PB for these assets would behave in a similar way to that illustrated in Figure 1. The increased risk of assets with an alpha series that decreased at a constant or increasing rate would accentuate the convexity of t^* . Consequently, the hurdle PB for these assets would increase less rapidly and approach its upper limit more quickly than the curves shown in Figure 1.

In selecting among capital assets, managers do not use the transformation of the CE in equation 5 or its variants to calculate a hurdle PB. However, their application of PB is consistent with one of the properties of equation 5. As noted earlier, t^* approaches an upper limit. Therefore, a decision rule requiring assets in a given risk class to have a PB less than the risk class's upper limit ensures a return sufficient to compensate for perceived risk. To apply this rule, however, a proposed asset's economic life must be sufficiently long for t^* to approach its maximum value. As can be seen from the graph, the appropriate economic life depends on the riskiness of the project, i.e., alpha.

To illustrate this application of PB, assume we have a group of assets with a risk function approximated by an exponential decay model with an

initial alpha value of 0.7. Using equation 4 the maximum value of t^* is 2.12 years. As Figure 1 shows, t^* begins to approach its maximum value about year 7. Therefore, requiring assets in this risk class and with economic lives of 7 years or greater to have a PB less than 2.12 years ensures investment decisions congruent with those of a CE model.

Although the requirement of a sufficiently long economic life is somewhat restrictive for investments with low levels of risk, it becomes progressively less constraining as the uncertainty of an asset's future cash flows increases. As indicated by the flat regions of the curves in Figure 1, PB is applicable to a wide range of assets in higher risk classes. This may account in part for Schall and Sundem's (1980) finding that PB was used more frequently in higher-risk environments.

Although information concerning the techniques used to determine an asset's hurdle PB is not provided from surveys of investment practice, t^* in all likelihood is determined subjectively. Even under these circumstances, t^* may impound much of the information relevant to an investment decision. Managers who frequently evaluate assets with similar risk characteristics may be expected to develop guidelines and rules of thumb for determining t^* . Through observation of the results of prior decisions using t^* , managers may refine these guidelines and rules over time. In effect, t^* is an adaptive technique through which decision makers implicitly impound the history of similar investment decisions as well as information concerning their current risk and return preferences.⁹

Surveys of corporate practice indicate that assessments of risk are frequently subjective in nature (see for example Schall, Sundem and Geijsbeek, 1978, and Pike, 1983a). Utilising a subjective measure of an asset's risk exposure in highly sophisticated and quantitatively oriented investment models may not be inherently superior to PB. In an environment where risk is assessed subjectively, PB has several desirable features. First, using a hurdle PB as a filter for identifying proposals with acceptable risk and return attributes may lead to decisions consistent with more quantitatively oriented investment techniques. Although PB's use is somewhat limited for investments with relatively certain cash flows, it is applicable to a wider range of assets as risk increases. Second, PB may be used to evaluate assets in a given risk

class.¹⁰ Identifying an asset's risk class requires a lower level of specificity than forecasting higher moments of its cash flows. Third, PB is a relatively economical technique to apply and one that is easily understood by decision makers. Finally, as illustrated in the next section, PB has a complementary relationship to other investment models.

Relationship of payback to profit-oriented investment models

Profit-oriented capital budgeting techniques, such as the accounting rate of return, net present value, and internal rate of return are the primary means of analysing capital assets (Gitman and Forrester, 1977). As indicated earlier, PB is employed most frequently as a secondary technique to supplement information provided by these models. Consequently, to explain the application of PB, it is necessary to evaluate not only its specific use(s) but also to examine its conceptual linkage and joint use with profit-oriented capital budgeting techniques. In the remainder of this section, these relationships are examined.

Accounting Rate of Return and Payback

One of the quantitative techniques employed frequently with PB is the ARR or unadjusted rate of return.¹¹ The ARR measures the average profitability of an investment relative to its initial capital outlay. Mathematically, the model may be expressed as:

$$ARR = \frac{1}{(N)(INV_0)} \sum_{i=1}^N NI_i \quad (6)$$

where NI_i = expected accrual accounting net income in period i .

An attraction of the ARR is its simplicity and articulation with accrual accounting measures, by which managers are frequently evaluated. However, critics of the technique note that it is an accounting rather than a cash flow concept, and that it does not consider the time value of money (Van Horne, 1986, p. 129).

Accrual accounting income represents a transformation of an asset's cash flows. Therefore, the ARR may be written in terms of expected cash flows as easily as expected net incomes. To verify this, note that an asset's life-time income is the sum of its cash flows less its original capital outlay. Mathematically, this may be expressed:

⁹Studies of information processing indicate that humans perform poorly in combining probabilistic information and may be biased when using heuristics (Libby and Lewis, 1982). However, unlike what happens in behavioural studies, in the real world the consequences of miscalculating t^* can be serious. Also decision makers will be able to adjust their decision rules for determining t^* as the results of prior decisions are realised.

¹⁰In the Schall, Sundem and Geijsbeek study (1978), 23% of the respondents assigned proposed assets to a risk class.

¹¹Criticisms of the ARR are well known, and little would be gained by discussing them. We are not advocating the use of either the ARR or PB as an investment model. Surveys of investment practice indicate that both models are widely used together to evaluate proposed assets. Accordingly, our objective is to explain how the two models may be applied jointly.

$$\sum_{i=1}^N NI_i = \left[\sum_{i=1}^N CF_i \right] - INV_0 \quad (7)$$

Substituting equation 1 into 7 we have:

$$\sum_{i=1}^N NI_i = \sum_{i=1}^N CF_i - \sum_{i=1}^t CF_i = \sum_{i=t+1}^N CF_i \quad (8)$$

Employing equation 8, the ARR may be rewritten:

$$ARR = \frac{1}{(N)(INV_0)} \sum_{i=t+1}^N CF_i \quad (9)$$

The relationship between PB and ARR may be developed from equations 1 and 9. Comparison of these two equations shows that PB and ARR are complementary capital budgeting techniques. PB incorporates the information of an asset's cash flows for years 1 to t , whereas the ARR incorporates the information of its remaining cash flows. More importantly, PB and ARR divide an asset's cash flows into two potentially useful subsets—those required for capital recovery and those available for subsequent profitability.

Net Present Value and Payback

Discounted cash flow techniques (NPV and IRR) are the capital budgeting models utilised most frequently as the primary means of evaluating proposed assets (Kim and Farragher, 1981, and Gitman and Forrester, 1977). The first of these models, NPV, is calculated as follows:

$$NPV = \sum_{i=1}^N \frac{CF_i}{(1+r)^i} - INV_0 \quad (10)$$

where r = the cost of capital.

The relationship between PB and NPV may be developed by incorporating the time value of money into the PB model. The resulting present value payback (PVPB) may be expressed:

$$\sum_{i=1}^t \frac{CF_i}{(1+r)^i} = INV_0 \quad (11)$$

Substituting equation 11 into 10 and simplifying, the NPV may be restated as:

$$NPV = \sum_{i=1}^N \frac{CF_i}{(1+r)^i} - \sum_{i=1}^t \frac{CF_i}{(1+r)^i} = \sum_{i=t+1}^N \frac{CF_i}{(1+r)^i} \quad (12)$$

As indicated by equations 11 and 12, PVPB and NPV are the discounted analogues of PB and ARR. Like PB and ARR, PVPB and NPV divide an asset's cash flows into two subsets—those required to break even and those available for profitability. Unlike PB and ARR, PVPB and NPV explicitly recognise the opportunity cost of invested funds.

PVPB is seldom utilised in practice. Rather, PB is employed in conjunction with NPV. Consequently, a nondiscounted cash flow technique (PB) is utilised to evaluate an asset's initial cash inflows, and a discounted cash flow technique (NPV) is

used to assess subsequent cash flows. For assets with a relatively short PB and/or low cost of capital, discounting has little impact on an asset's initial cash flows; therefore, PB may closely approximate PVPB. However, for assets with a relatively long PB or a high cost of capital, the difference between PB and PVPB may be substantial. For these classes of assets, the cash flows between t and the PVPB, although significant, are not reflected in either the PB or NPV. Consequently, the joint application of PB and NPV fails to reflect fully the informational content of an asset's cash flows. In these situations, the joint use of PB and NPV may be less satisfactory than the use of PVPB and NPV and may result in less appropriate investment decisions.

Internal Rate of Return and Payback

The second discounted cash flow technique utilised frequently with PB is the IRR. Although seemingly unrelated, PB and IRR provide information about an asset's return at significant points during its economic life. Payback, as noted earlier, measures the point at which an asset is expected to break even or earn a zero rate of return. The IRR measures an asset's return over the whole of its economic life. In effect, PB and IRR both provide information about an asset's time and return attributes. Payback identifies the point in an asset's economic life when it is expected to break even while the IRR measures the return expected if it is held to the end of its economic life.

Joint Application of Payback and a Profit-Oriented Model

Analysed jointly, PB and a profit-oriented model facilitate evaluating multiple attributes of an investment. In evaluating proposed risky projects, PB may be used as a preliminary technique to identify projects with acceptable risk and return attributes. Proposals that meet the requirements of the filter may then be examined more thoroughly with a profit-oriented investment model. Early in the analysis phase of capital budgeting, PB alerts a decision maker to proposals with potentially problematic cash flows. Identifying these assets and excluding them from further analysis increases the efficiency of the capital budgeting process and permits a manager to focus his analysis on the subset of the more desirable investments initially proposed. If an investment that fails to meet the firm's required PB is evaluated further, such as a research and development project sponsored by a politically powerful manager, a decision maker is alerted early during preliminary analysis to its problematic risk and return attributes. In these situations, a decision maker may seek additional information to help clarify the project's risk and return attributes to facilitate subsequent discussions of the proposal.

Summary and conclusions

The use of PB appears to be linked with the subjective assessment of risk frequently encountered in investment practice. In this environment, PB provides a convenient means of evaluating an asset's risk in certain situations. By observing the results of similar investment decisions over time, a manager may adjust the firm's hurdle PB to reflect an asset's perceived risk. As demonstrated in the paper, applying a hurdle PB to evaluate proposed assets may lead to investment decisions congruent with more quantitatively oriented models.

The use of PB is also traceable to its complementary relationship to profit-oriented capital budgeting techniques. As demonstrated by equations 1, 9, 11 and 12, PB and profit-oriented models measure different attributes of an investment and complement one another in describing and analysing its cash flows.

Although PB is more useful in providing information relevant to a capital budgeting decision than is generally recognised, it represents, at best, a short-cut technique for generating and evaluating investment information. The traditional arguments presented against PB—that it does not measure an asset's profitability or incorporate the time value of money—fail to recognise that PB is seldom used to measure these attributes. These arguments are, therefore, somewhat spurious and potentially misleading. Alternative and more relevant criticisms can be made regarding the subjective manner in which t^* is used to impound investment information.

As noted earlier, the use of PB appears to be linked with the subjective assessment of risk frequently found in investment practice. Development of alternative methods and techniques for measuring uncertainty, therefore, offers a potentially fruitful avenue for advancing both the theory and practice of capital budgeting. Perhaps equally important, it offers the most effective means of removing the conditions that motivate the need for heuristics such as PB.

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JOURNAL OF BUSINESS FINANCE & ACCOUNTING

Editor: Richard Briston

Winter 1987

Vol. 14 No. 4

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Measuring Harmonisation of Financial Reporting Practice*

Leo G. van der Tas

Abstract—Many organisations are currently engaged in the process of national and international harmonisation of financial reporting. This paper examines the nature of the harmonisation problem and the possibility of developing a method to quantify the degree of harmony of financial reporting practice. This quantification can be useful in determining problem areas where the degree of harmony is low, and the impact of standards on financial reporting harmony and spontaneous harmonisation, i.e. harmonisation that cannot be attributed to laws, standards or guidelines. Standard setters might use the method to set goals in respect of the required degree of harmony when issuing a standard, guideline or opinion.

Introduction

Many national and international organisations, such as the Accounting Standards Committee, the Financial Accounting Standards Board (FASB), the International Accounting Standards Committee (IASC) and the European Community (EC), and also governments, are currently engaged in the process of national and international harmonisation of financial reporting. They issue guidelines, standards and laws aiming, among other things, at the harmonisation of financial reporting practice. However, it is not always clear what harmonisation is and how to measure the impact that these organisations have on the degree of harmony.

This paper tries to quantify degrees of harmonisation. First, a framework will be developed to define harmonisation, identify the various harmonisation objects and state the object to be measured. Subsequently a method will be developed that quantifies the degree of harmony of financial reporting practice for each item in the annual accounts. This method can be used by the organisations mentioned above to identify problem areas requiring harmonisation. Second, it is possible with the aid of this method to determine when and to what extent harmonisation has taken place. Third, the method can be used to measure what impact the above-mentioned organisations have on the harmonisation of financial reporting practice by attributing changes in the degree of harmony to three factors:

1. the introduction or amendment of mandatory provisions;

2. the introduction or amendment of non-mandatory provisions;
3. spontaneous harmonisation, for example as a consequence of developments abroad or evolution of practice.

Definition of harmonisation

Financial reporting is a communication process. A company translates the events that influence its financial position and affairs into its financial report so as to provide users with information about its financial position and affairs. The translation process is based upon the company's accounting policies. As part of these policies, a company decides whether to translate a particular event in its financial report (the decision between alternative degrees of disclosure) and which accounting method to apply (the choice between alternative methods of valuation, profit determination, consolidation and presentation). For example, the company must decide whether to provide segmental information and forecasts, and whether to use historical cost or current value.

When formulating an accounting policy the company's choice between alternative degrees of disclosure and alternative accounting methods is restricted by standards. Standards will be defined as any financial reporting rule published by either the government or a private standard setting body. These standards can refer either to the degree of disclosure or to the accounting method to be applied.

Harmonisation is a coordination, a tuning of two or more objects. Users are confronted with several financial reports. It would be useful for them if these financial reports were more in harmony. Therefore, financial reports are a target of harmonisation. One way to harmonise financial

*This paper is a revision of one presented at the Ninth Annual Congress of the European Accounting Association in Stockholm, March 1986. The author would like to thank Professors M. A. van Hoepen and F. Krens for their valuable comments on a previous draft.

reports is by formulating standards, thus setting limits to the difference between financial reports. Standards are not only a means of achieving the harmonisation of financial reports. They are also an object of harmonisation themselves. Companies, notably multinationals, are confronted with differing and sometimes conflicting national standards. For them harmonisation of standards is presumed to be useful.

Harmonisation of financial reports will be called *material harmonisation* while harmonisation of standards will be called *formal harmonisation*. This paper is confined to material harmonisation. When measuring the degree of material harmony it is possible to determine the impact of standards and formal harmonisation on material harmonisation. Since they limit the company's choice between alternatives, standards lead towards harmonisation. Formal harmonisation is not only an end in itself but also a means of accomplishing material harmonisation by coordinating the national standards. However, formal harmonisation may be accompanied by disharmonisation if the coordination of standards leads to more options for companies in one country. It should also be noted that material harmonisation can take place without being initiated by standard setting. This will be referred to as spontaneous harmonisation. The harmonisation of financial reports or standards can refer either to the degree of disclosure or to the accounting method to be applied. Harmonisation of the extent of disclosure will be called *disclosure harmonisation*, while harmonisation of the applied accounting methods will be called *measurement harmonisation*. This paper is confined to measurement harmonisation.

Thus, this paper is concerned with the harmonisation of financial reports in respect of the accounting method applied (material measurement harmonisation), which implies an increase in the degree of comparability of financial reports. Two financial reports are comparable in respect of one specific event if under the same circumstances this event is accounted for in the same way in both reports or if multiple reporting takes place. Multiple reporting means that a company gives additional information based on an accounting method other than its primary accounting method. There are three forms of multiple reporting:

1. A company provides two financial reports, each based on a different accounting method.
2. A company provides one financial report with two sets of annual accounts based on two different accounting methods.
3. A company provides one financial report with one set of annual accounts, but gives additional information so that the primary accounts can be transformed into secondary accounts based on another accounting

method. For example, a company defers research and development (R&D) costs and writes them off in subsequent years. In order to make the accounts comparable with the accounts of a company which writes off R&D costs immediately, this company gives additional information, specifically the level of R&D costs deferred and the level of R&D costs written off in the current year.

In conclusion we reach the following definition:

Material measurement harmonisation is an increase in the degree of comparability and means that more companies in the same circumstances apply the same accounting method to an event or give additional information in such a way that the financial reports of more companies can be made comparable.

The words 'comparability' and 'harmony' will be used as synonyms for 'material measurement harmony'.

Another problem to be addressed is the question of when circumstances are the same. A distinction can be made between the circumstances of the company itself and the circumstances in which an event to be accounted for occurs. In the first case, the nature of the firm is involved. Taking a narrow point of view one could state that every firm operates under unique circumstances, and that consequently each firm can set up its financial reports in the way it thinks is best in line with these unique circumstances. Taking a broader point of view, companies can be grouped into categories of the same industry or the same product groups. However, most of the organisations engaged in the process of harmonisation of financial reporting use an even coarser division. In general, only companies in a limited number of sectors (such as banking and insurance) are thought to be in a position which is so special that separate provisions are necessary. This latter view is taken in this paper.

In the second case, the nature of the event is involved. We should guard against unlike events being accounted for in the same way simply for the sake of harmonisation. For example, it might be argued that the choice of depreciation method should not be imposed on the companies. This choice depends upon the situation within the company, such as the expected useful lifetime of the asset and the production process.

Measurement methods

National Harmonisation

In this section a method is developed to measure the degree of comparability for each item in the

financial reports, based upon the number of financial reports which are comparable in respect of an item: for example, acquisitions of fixed assets, treatment of foreign currencies. It is presumed here that two financial reports are either comparable or not comparable in respect of one item. Thus, there is no gradation in comparability when only one item is taken into account. First, a method is developed without taking multiple reporting into account. Subsequently this method is modified to make allowance for multiple reporting.

Comparability increases when the result of the choice that companies make between alternative accounting methods becomes concentrated on one or on only a limited number of accounting methods, even where the number of available methods remains the same. Thus, comparability can be considered as an increase in the degree of consensus concerning the choice between the alternative methods of accounting for an item in financial reports. Kirkpatrick (1985) suggests that a reduction in the number of alternative accounting practices contributes to harmonisation. However, the degree of harmony depends not only on the number of alternative accounting methods used, but also on the extent to which each method is applied.

The increase in the degree of consensus can be forced or stimulated, or it may be spontaneous. In the first case mandatory provisions prescribe or forbid one or more accounting methods. In the second case non-mandatory guidelines recommend or discourage the application of one or more accounting methods. In the third case the increase of the degree of consensus cannot be attributed to the introduction or amendment of mandatory or non-mandatory provisions. This spontaneous harmonisation may be caused by developments in theory, experimentation or developments in other countries.

Harmony should not be seen as synonymous with rigid uniformity. As stated in the preceding section, one should take account of differences in circumstances. The companies included in the sample to which the method is applied should be chosen carefully. They should be operating under like circumstances. It is also possible to apply the method only to companies operating in a specific industry.

Statistical methods have been developed to measure the degree of concentration. One of these concentration indices is the Herfindahl index (Theil, 1973, pp. 42-43), which is calculated by weighting the relative frequencies of the alternative opinions against each other. This means that high relative frequencies have a higher weighting than low relative frequencies. As a consequence, the Herfindahl index (H index) rises when the methods of the parties involved concentrate more on one or only a limited number of alternative methods. In this context the frequency of a method means the

number of parties choosing this particular method. The relative frequency is the number of parties choosing this particular method divided by the total number of parties.

An example may serve to illustrate the H index. A particular item can be accounted for by two different methods, A and B. Fifty companies from a group of 100 companies apply method A in period 1. The other 50 apply method B. In period 2, 70 companies apply method A and 30 companies method B. In period 3 the ratio is 90:10. The relative frequencies and the H index derived from these data are given below:

Period	Method		H Index
	A	B	
1	0.5	0.5	$0.5^2 + 0.5^2 = 0.5$
2	0.7	0.3	$0.7^2 + 0.3^2 = 0.58$
3	0.9	0.1	$0.9^2 + 0.1^2 = 0.82$

This is only a trivial example but it clearly shows that the H index increased, indicating an increase in the concentration of opinions and a growth in the degree of consensus. Thus, in this case the degree of harmony rose, which means that harmonisation took place. This method can also be applied in cases involving more than two different methods. The formula of the Herfindahl index is:

$$H = \sum_{i=1}^n p_i^2 \quad (1)$$

where:

H = Herfindahl index.

n = number of alternative accounting methods.

p_i = the relative frequency of accounting method i .

The H index fluctuates between 0 (no harmony, with an infinite number of alternative methods all with the same frequency) and 1 (all companies using the same method). The movements of this index indicate the degree of (dis-) harmonisation. The number of different opinions is, in this case, the number of accounting methods applied in practice. However, if all theoretically possible accounting methods are taken into account, this leads to the same H value because the H index does not change when accounting methods with a frequency of 0 are added.

The Herfindahl index is only one of many concentration measures. The advantage of this method is that it is simple but on the other hand gives more information than the rough method of taking as a measure the relative frequency of the accounting method most applied by the examined companies or the sum of the relative frequencies of the two or three accounting methods most applied, especially when many alternative accounting methods are applied. If only two accounting methods are differentiated as is the case in the simple illustration above, the rough method of only taking into

account the relative frequency of the accounting method most applied leads to the same conclusion as the application of the H index. But if more than two alternative accounting methods can be distinguished the H index is a more refined method of measuring harmony/harmonisation. The following examples illustrate the application possibilities of the Herfindahl index.

Example I. Deferred Tax in the UK

In the *Survey of Published Accounts* (ICAEW, 1968–1981) the following ways of presenting deferred tax were found:

1. As a separate heading or grouped with deferred liabilities.
2. Grouped with current liabilities.
3. Grouped with reserves.
4. As a deduction from assets less current liabilities.
5. Not identifiable in balance sheet, but transfer shown in profit and loss account.

The following regulations relate to how deferred tax should be presented in the balance sheet:

Companies Act 1967: not as a reserve.

Recommendation N27 of the ICAEW, July 1968: not as a reserve, nor as a current liability.

Exposure Draft 11, May 1973: not as a reserve, nor as a current asset or current liability.

SSAP 11, August 1975: same as ED 11.

Exposure Draft 19, May 1977: not as a reserve, but presentation as a current asset or current liability is allowed again.

SSAP 15, October 1978: same as ED 19.

Companies Act 1981: as a provision.

As can be seen, method III was rejected in 1967. Method II was rejected in 1968, but allowed again in 1977 (proposal) and 1978 (definitive).

Table 1 shows the application frequencies of these five methods in the period from 1968 to 1980. The ICAEW Surveys in respect of deferred tax only covered this period, so one cannot examine the impact of the Companies Act 1967, of N 27 or of the Companies Act 1981. This table also contains the relative frequencies and the H indices. Figure 1 is a graph of the fluctuations of the H index and the periods in which the provisions concerning deferred tax mentioned above were issued.

The figure shows a gradually rising trend until 1978, indicating an increase in the degree of harmony. In 1971 the H index shows a fall which cannot be explained here. In 1978 the rising trend changed into a declining one. This was caused by the fact that SSAP 15 (October 1978) gave companies more freedom in the presentation of deferred tax by allowing them to be presented as a current asset of current liability.

The following conclusions can be drawn from this example:

—The H index of the presentation of Deferred Tax shows a gradual increase in the 1968–1978 period which cannot be attributed to the introduction or amendment of mandatory or non-mandatory provisions. In other words, spontaneous harmonisation took place.

—The impact of the introduction or amendment of provisions can be measured by the H index (see, for example, the change after SSAP 15 was introduced).

Table 1
Frequencies and, in brackets, relative frequencies of deferred tax methods

Period	I	II	Method III	IV	V	Total	H Index
1968	161 (0.809)	6 (0.03)	6 (0.03)	26 (0.131)	—(—)	199	0.673
1969	169 (0.849)	3 (0.015)	4 (0.02)	23 (0.116)	—(—)	199	0.735
1970	176 (0.871)	3 (0.015)	2 (0.01)	20 (0.099)	1 (0.005)	202	0.769
1971	205 (0.833)	3 (0.012)	8 (0.033)	29 (0.118)	1 (0.004)	246	0.709
1972	241 (0.92)	—(—)	4 (0.015)	17 (0.065)	—(—)	262	0.851
1973	248 (0.915)	1 (0.004)	2 (0.007)	20 (0.074)	—(—)	271	0.843
1974	254 (0.907)	—(—)	1 (0.004)	25 (0.089)	—(—)	280	0.831
1975	266 (0.908)	—(—)	—(—)	27 (0.092)	—(—)	293	0.833
1976	275 (0.945)	—(—)	—(—)	16 (0.055)	—(—)	291	0.896
1977	252 (0.962)	2 (0.008)	1 (0.004)	7 (0.027)	—(—)	262	0.926
1978	237 (1)	—(—)	—(—)	—(—)	—(—)	237	1
1979	239 (0.992)	2 (0.008)	—(—)	—(—)	—(—)	241	0.984
1980	213 (0.943)	13 (0.058)	—(—)	—(—)	—(—)	226	0.892

Source: *Survey of Published Accounts*, Institute of Chartered Accountants in England and Wales.

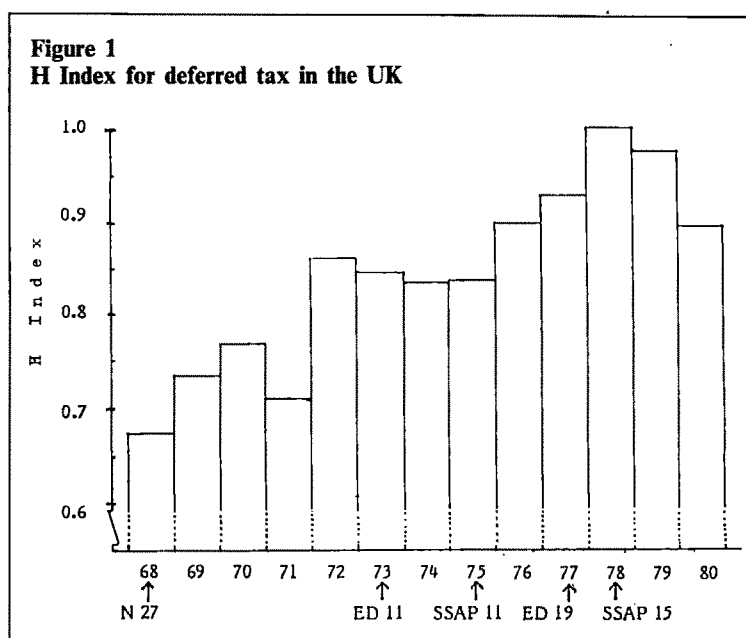


Table 2
Frequencies and, in brackets, relative frequencies of WIR methods

Period	Method			Total	H Index
	1	2	3		
1978	5 (0.062)	21 (0.259)	55 (0.679)	81	0.532
1979	3 (0.032)	19 (0.204)	71 (0.763)	93	0.625
1980	1 (0.011)	17 (0.181)	76 (0.809)	94	0.687
1981	1 (0.011)	15 (0.158)	79 (0.832)	95	0.717
1982	1 (0.011)	13 (0.139)	80 (0.851)	94	0.744
1983	2 (0.017)	15 (0.13)	98 (0.852)	115	0.743
1984	2 (0.017)	14 (0.121)	100 (0.862)	116	0.758

Sources: 1978–1982: Beckman (1980) and Noordzij (1984);
1983–1984: Van der Tas (1986).

Example II. Accounting for the WIR (Investment Tax Credit) in the Netherlands

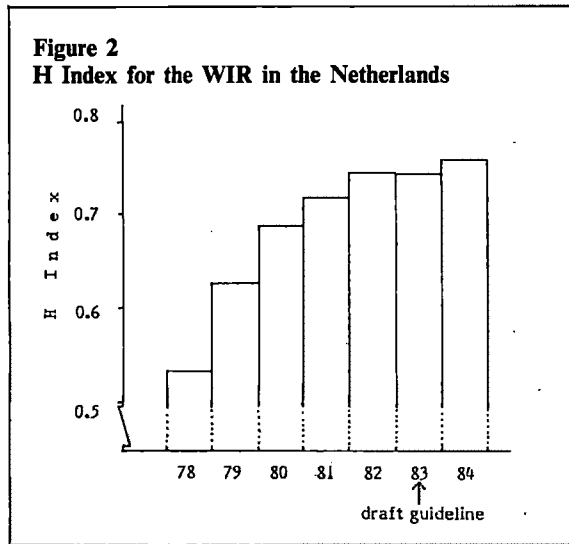
In 1978 an investment stimulation plan was introduced. This involved an investment tax credit (WIR), comparable to the investment tax credit in the United States before it was abolished by the Tax Reform Act in 1986. There are three ways of accounting for the WIR:

1. The credit is recognised directly in the Profit and Loss Account or in Equity in the year it is awarded (flow-through method).
2. The credit is deducted from the investment, thus leading to lower depreciation in subsequent years (deduction method).
3. The credit is charged to an equalisation ac-

count on the credit side of the balance sheet and expensed during subsequent years (equalisation method).

In 1983 the Dutch Council for Annual Reporting (Raad voor de Jaarverslaggeving, 1983) issued a draft guideline stating its preference for methods 2 and 3.

Table 2 contains the application frequencies of these three methods for the surveyed companies in the period 1978 to 1984. In the same table the relative frequencies and the H indices are given. In Figure 2 fluctuations in the H index are plotted and the period in which the draft guideline was issued is indicated. The figure shows clearly a strong increase in the H index. The draft guideline had a slight impact on the degree of harmony at the very time when the process of harmonisation stopped.



Example III. Accounting for the Investment Tax Credit (ITC) in the US

In *Accounting Trends and Techniques* (AICPA, various years) two different methods were found to account for the ITC:

1. Flow-through method, comparable to method 1 in Example II;
2. Deferral method, comparable to methods 2 and 3 in Example II.

Table 3 gives the application frequencies of the two methods in the 1965–1982 period based on data from *Accounting Trends and Techniques*. In Figure 3 the H index is plotted against time. The degree of harmony clearly rose during this period. More and more companies applied the flow-through method, even though the Accounting Principles Board (APB) had rejected this method in 1962 (Opinion 2) and, after Congress overrode this Opinion, had allowed but discouraged the method in 1964 (Opinion 4).

Example IV. The WIR equalisation account in the Netherlands

If a company applies the equalisation method (method 3 in Example II), the WIR equalisation account can be presented in five ways:

1. As a current liability;
2. As a non-current liability or as a provision;
3. As part of the reserves;
4. As a separate item between debt and equity (deferred income);
5. As a separate deduction from fixed assets.

In a 1983 draft guideline the Council for Annual Reporting discouraged presentation as part of the reserves or as a provision. In 1984 the EC Fourth Directive was implemented in Book 2 of the Dutch Civil Code as a new Title 8. This makes it clear that a WIR equalisation account cannot be presented as a provision.

Table 3
Frequencies and, in brackets, relative frequencies of ITC methods

Period	Method		Total	H Index
	1	2		
1965	226 (0.787)	61 (0.213)	287	0.665
1967	257 (0.793)	67 (0.207)	324	0.672
1968	290 (0.815)	66 (0.185)	356	0.698
1969	300 (0.831)	61 (0.169)	361	0.719
1970	245 (0.819)	54 (0.181)	299	0.704
1971	329 (0.801)	82 (0.199)	411	0.681
1972	489 (0.864)	77 (0.136)	566	0.765
1973	496 (0.864)	78 (0.136)	574	0.765
1974	504 (0.875)	72 (0.125)	576	0.781
1975	518 (0.896)	60 (0.104)	578	0.814
1976	502 (0.869)	76 (0.131)	578	0.772
1977	504 (0.871)	75 (0.129)	579	0.775
1978	521 (0.88)	71 (0.12)	592	0.789
1979	529 (0.888)	67 (0.112)	596	0.801
1980	528 (0.887)	67 (0.113)	595	0.8
1981	531 (0.895)	62 (0.105)	593	0.813
1982	537 (0.909)	54 (0.091)	591	0.834
1983	541 (0.915)	50 (0.085)	591	0.844
1984	543 (0.919)	48 (0.081)	591	0.851

Source: *Accounting Trends and Techniques*.

Figure 3
H Index for the ITC in the US

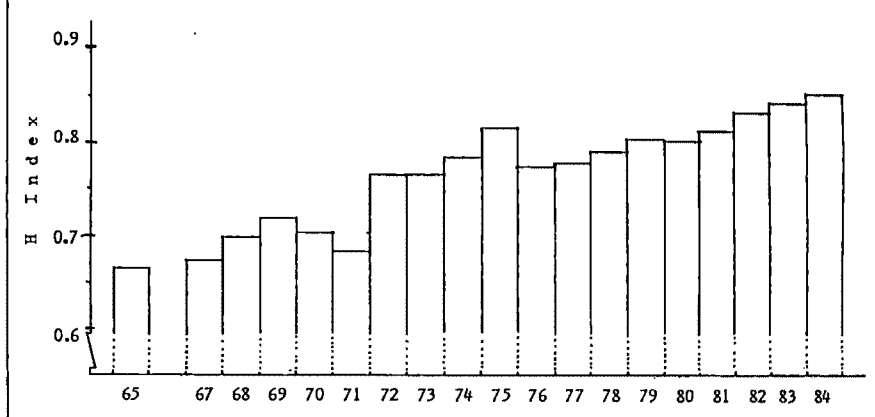


Table 4 shows the application frequencies of these five methods in the examined financial reports. In Figure 4 the fluctuations of the H index are plotted, showing a slight increase from 1978 to 1983 and a big increase in 1984, caused by the new legislation.

Multiple Reporting

The advantage of the H index is that it is simple and easy to calculate. However, a disadvantage is its inability to take account of multiple reporting, because each company can only be assigned to one of the alternative accounting methods. Here a method will be developed which does take multiple reporting into account.

The degree of comparability of financial reports in a country can be measured by relating the number of 'compatible' pairs of companies to the number of pairings possible. The financial reports of two companies are compatible if both companies apply the same accounting method or if one or both of the companies give additional information to enable comparison. For example, if there

Figure 4
H Index for the WIR equalisation account in the Netherlands

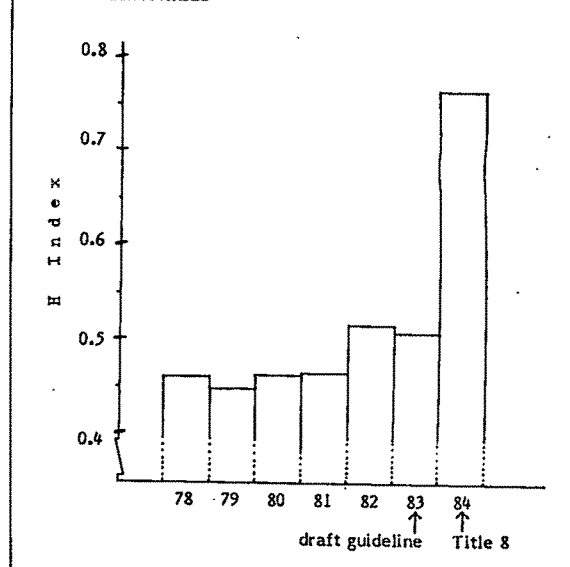


Table 4

Frequencies and, in brackets, relative frequencies of the WIR equalisation account

Period	Method					Total	H Index
	1	2	3	4	5		
1978	2 (0.036)	30 (0.546)	1 (0.018)	22 (0.4)	— (—)	55	0.459
1979	2 (0.028)	35 (0.493)	2 (0.028)	32 (0.451)	— (—)	71	0.448
1980	1 (0.013)	37 (0.487)	2 (0.026)	36 (0.474)	— (—)	76	0.462
1981	1 (0.013)	36 (0.456)	2 (0.025)	40 (0.506)	— (—)	79	0.465
1982	— (—)	30 (0.375)	1 (0.013)	49 (0.613)	— (—)	80	0.516
1983	— (—)	35 (0.358)	— (—)	61 (0.617)	2 (0.025)	98	0.51
1984	— (—)	10 (0.107)	— (—)	88 (0.869)	2 (0.024)	100	0.767

Sources: 1978–1982: Beckman (1980) and Noordzij (1984); 1983–1984: Van der Tas (1986).

Table 5
Frequencies of valuation methods, and C Index

Period	Method								Total	C Index
	A	B	C	D	E	F	G	H		
1976	73	26	0	2	7	2	1	0	111	0.633
1977	71	29	0	2	7	1	1	0	111	0.611
1978	63	29	0	3	14	2	1	0	112	0.634
1979	59	30	0	3	17	2	1	0	112	0.644
1980	56	30	0	3	20	2	1	0	112	0.659
1981	55	30	0	3	21	2	1	0	112	0.664
1982	54	31	0	3	21	2	1	0	112	0.660
1983	53	30	0	3	23	2	1	0	112	0.674
1984	46	20	0	2	41	1	0	1	111	0.811
1985	46	19	0	2	43	1	0	1	112	0.821

A. historical cost
 B. current value
 C. land at current value, buildings at historical cost
 D. land at historical cost, buildings at current value
 E. both A and B
 F. both A and C
 G. both B and D
 H. both A, B and D

by way of additional information in the notes

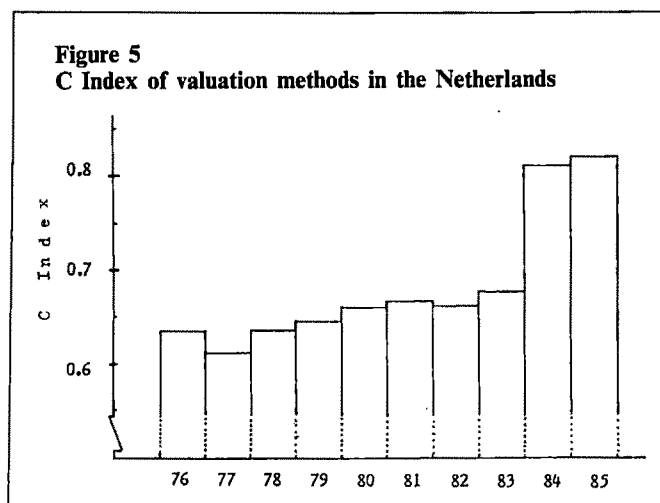
are three companies (A, B and C), the total number of comparisons is three, namely between A and B, between A and C and between B and C. Suppose company A applies accounting method I and the other two companies apply method II. In this case the degree of harmony is $1/3$, i.e. the number of compatible pairs (one, namely B and C), divided by the total number of comparisons (three). In the next period company B gives information based on both method I and method II. In that case the number of compatible pairs is two (A and B, and B with C). So the degree of harmony has increased from $1/3$ to $2/3$.

The result is an index, ranging from 0 to 1, which we will call the C index. If the number of examined financial reports is large and no multiple reporting takes place, the C index approximately equals the

H index discussed above. The advantage of the C index, however, is its ability to take account of multiple reporting. The derivation of the formula of the C index is shown in Appendix 1. The same applies to the proof of the statement that the C index and the H index are approximately equal when a large number of companies is examined and no multiple reporting takes place. An example of the application of the C index follows.

Example V. Valuation of Land and Buildings in the Netherlands

Both historical cost and current value are allowed as valuation methods for land and buildings. Many companies, when applying one of these methods, provide additional information based upon the other. Table 5 shows the findings of an



examination of how many companies listed on the Amsterdam Stock Exchange provide additional information on the value of land and buildings based upon the method not used in the main financial statements. The fluctuations in the C index are shown in Figure 5.

The increase in the C index in 1984 was caused by the new Title 8 of the Dutch Civil Code which encouraged companies applying historical cost to give additional information about the current value of these assets.

International Harmonisation

There are two ways of looking at international material harmonisation. From the first point of view international harmony is the degree of comparability of financial reports of companies irrespective of the country in which they are established. This could be the point of view of an international investor who wants to compare financial reports irrespective of the home country of the companies. From the second point of view international harmonisation takes place when there is a convergence of opinions in two or more countries on the way in which a specific item should be accounted for. This could be the point of view of a standard setting body that wants to know what differences exist between the countries in respect of the way in which a particular item is accounted for.

From the first point of view international harmony is measured in the same way as national harmony, except that the area of examination consists of more than one country. The two indices developed above can be applied accordingly. However, it should be borne in mind that, in this case, countries with many companies have a larger weighting than countries with fewer companies. From the second point of view the degree of international material harmony indicates the degree to which the companies in one country apply the same or only a limited number of alternative accounting methods, compared to the companies in another country. It can be measured in the

following way. If the companies in two countries apply the same method to a large extent this means that the relative frequencies with which this method is applied in the two countries reinforce each other. So we can measure the degree of international material harmony by multiplying the relative application frequency of a method in country A by the relative application frequency of the same method in country B and subsequently by adding the results of all alternative methods. This sum will be called the I index.

As an example of the use of the I index, assume that the relative frequencies of the alternative accounting methods 1 and 2 in countries A and B are as follows:

	Country		
Time 1:	A	B	I index
Method 1	1	0	$1 \times 0 + 0 \times 1 = 0$
2	0	1	
Time 2:			
Method 1	0.6	0.3	$0.6 \times 0.3 + 0.4 \times 0.7 = 0.46$
2	0.4	0.7	

The result is an index ranging from 0 to 1, indicating the degree of international material harmony. The formula of the I index is:

$$I = \sum_{i=1}^n (f_i^1 \times f_i^2) \quad (2)$$

where

f_i^1 = the relative application frequency of method i in country 1.

n = the number of alternative accounting methods.

Example VI. I Index for the ITC in the US and the Netherlands

In the previous section, we saw an increasing application of the flow-through method in the US, while in the Netherlands the deferral method received greater support. The frequencies and relative frequencies in the USA and the Netherlands as well as the I indices are given in Table 6, which

Table 6
I Index for ITC

Period	Netherlands		US		I Index
	deferral	flow-through	deferral	flow-through	
1978	0.938	0.062	0.12	0.88	0.167
1979	0.968	0.032	0.112	0.888	0.137
1980	0.989	0.011	0.113	0.887	0.122
1981	0.989	0.011	0.105	0.895	0.113
1982	0.989	0.011	0.091	0.909	0.1
1983	0.983	0.017	0.085	0.915	0.099
1984	0.983	0.017	0.081	0.919	0.095

The I index for 1978, for example, is calculated as:
 $0.938 \times 0.12 + 0.062 \times 0.88 = 0.167$

shows that the degree of international harmony decreased, while the two countries concentrated on a different method. They moved in opposite directions.

This method is also applicable to more than two countries. In that case, however, a correction factor should be built in, as otherwise the I index would be very unequally distributed over the interval 0 to 1. The resulting formula and the statistical motivation for the correction factor can be found in Appendix 2.

Application possibilities

The potential applications of such a quantification of the degree of material measurement harmony/comparability are:

1. It gives an indication of the degree of harmony in respect of the accounting treatment of a specific item at a particular moment.
2. Fluctuations in the degree of harmony indicate when and to what extent harmonisation has taken place.
3. Fluctuations in the degree of harmony can be attributed to:
 - the introduction or amendment of mandatory provisions concerning financial reporting;
 - the introduction or amendment of non-mandatory provisions concerning financial reporting;
 - spontaneous harmonisation caused, for example, by developments in accounting theory or developments abroad.
4. It can be used to identify problem areas in financial reporting; these are the items with a low degree of harmony.
5. Organisations concerned with the harmonisation of financial reporting might use the measurement method to set goals in respect of the desired degree of harmony for a certain item in the financial report. In that case the degree of harmony achieved by a standard or by harmonisation of standards can be compared with the goal being pursued.

As mentioned earlier, comparability of financial reporting is related to the circumstances of the reporting companies as well as to the circumstances under which an event to be accounted for takes place. Harmonisation should not lead to unlike circumstances being accounted for in the same way. This means that, when applying the developed measurement methods, the sample of companies to be examined should be chosen carefully. What exactly is meant by 'like circumstances' is open to discussion but is independent of the measurement method. It influences only the sample of companies to be examined.

The problem of like circumstances also has an impact on the question of whether there is any purpose in calculating the degree of harmony in respect of a specific item. For example, the choice of the depreciation period depends on the specific circumstances within the company such as the production process and the expected useful lifetime of the assets. Thus, calculating the degree of harmony in respect of the depreciation period applied to specific assets is of hardly any use.

A practical problem is that it is not always possible to determine the way in which a company has chosen to account for an item, for example because of insufficient explanation. Moreover it can prove difficult to determine whether a company did not account for a particular item because it was not applicable or because the company opted not to take the item into account. For example if a company presents no deferred tax in its balance sheet, there are two possibilities:

- there is no deferred tax; or
- there is deferred tax, but the company applied the flow-through method, which does not take deferred tax into account.

These practical problems may hamper the application of the described measurement methods.

However, there is a third limitation of a more fundamental character. The measurement indices presuppose that the differences between the alternative accounting methods are of about the same size. If three alternative methods are distinguished (A, B and C) the measurement indices presuppose that the magnitude of the differences between A and B, B and C and between B and C are about the same. This is not always true, as we saw in Examples II and III concerning accounting for the ITC. The difference between the flow-through method and the other two methods is larger than the difference between the deduction method and the equalisation method. This problem arises at the time when the alternative accounting methods are distinguished, even before collecting the data. This might impose a limitation on judging the degree of material harmony. On this subject, three remarks should be made here:

- It was assumed that financial reports are not comparable if they are each based on a different accounting principle, regardless of the extent of the difference between the methods. Two financial reports are either comparable or not; there is no gradation in comparability when only one item is taken into account.
- The most important advantage of the described methods is the possibility of quantifying the degree of harmonisation. This means that *fluctuations* in the degree of harmony are more important than the level of harmony. Thus, once a particular classification of alternative account-

ing methods is chosen, the problem of unequal differences is of minor importance. In any case it is possible to determine whether and when (dis-) harmonisation took place. Only the determination of the extent to which harmonisation took place might cause some difficulties.

—A solution to the problem of unequal differences between the alternative accounting methods could be found by applying a more sophisticated measurement method that weights the differences between the alternative accounting methods. Further research should determine how this could be realised.

Conclusion

In this paper there is an attempt to identify ways of quantifying the degree of harmony in financial reporting practice. First, it was concluded that harmonisation is a process whereas harmony is a state. Harmonisation is an increase in the degree of harmony. Subsequently, a distinction was made between formal and material harmonisation. *Formal harmonisation* is harmonisation of the provisions concerning financial reporting. *Material harmonisation* is harmonisation of financial reporting practice itself. A second distinction was made between *disclosure harmonisation* (harmonisation of the extent of information disclosure) and *measurement harmonisation* (harmonisation of the nature of information disclosed). This paper is confined to material measurement harmony, which is an increase in the degree of comparability of financial reporting practice. More specifically:

Material measurement harmonisation means that more companies in the same circumstances apply the same accounting method to an event or give additional information in such a way that the financial reports of more companies can be made comparable.

Based on this definition, a statistical concentration index was used to develop a method that quantifies the degree of comparability (the H index). This method could not, however, take account of multiple reporting (supplying information based on more than one accounting method). So the next step was to develop a method that could take account of multiple reporting (the C index). These two methods can be used to measure national comparability. They can also be used to measure international comparability from the point of view of an international investor or creditor but are less suited for measuring international comparability from the point of view of an international standard setter, for which a third method was described which is more suitable (the I index).

These methods were illustrated by applying them to some items in financial reporting, with the conclusions that it is possible to quantify the

degree of harmony and harmonisation of financial reporting. It also proved possible to measure the influence of mandatory and non-mandatory provisions concerning financial reporting and the degree of spontaneous harmonisation.

Organisations engaged in the process of harmonisation of financial reporting might use the developed measurement methods to set goals in respect of the degree of harmony of a particular item in financial reporting. In this way the realised degree of harmony can be compared with the desired degree of harmony in order to evaluate the impact of a specific standard, guideline or law.

Appendix 1. Formula for the C Index

The C index divides the number of compatible pairs of financial reports by the total number of possible comparisons. The number of pairs of financial reports out of a sample of n financial reports is:

$$0.5 \times (n^2 - n). \quad (3)$$

Two financial reports are comparable if they are based on the same accounting method. This means that, if no multiple reporting takes place, the total number of financial reports must be subdivided into classes of financial reports with the same accounting method in respect of a specific item. *Within* these classes it is possible to compare the financial reports. However it is not possible to make comparisons *between* financial reports in different classes. The number of possible comparisons within such a class is $0.5(a_i^2 - a_i)$ where a_i is the number of financial reports within this class. This means that the total number of compatible pairs is:

$$0.5(a_1^2 - a_1) + 0.5(a_2^2 - a_2) + \dots + 0.5(a_i^2 - a_i)$$

where

a_i = the number of companies applying accounting method i .

i = the number of alternative accounting methods.

This sum must be divided by the total number of possible comparisons. So the formula for the C index is:

$$C = \frac{0.5(a_1^2 - a_1) + 0.5(a_2^2 - a_2) + \dots + 0.5(a_i^2 - a_i)}{0.5(n^2 - n)} = \frac{\left(\sum_{i=1}^i a_i^2\right) - n}{n^2 - n} \quad (4)$$

where:

a_i = the number of companies applying accounting method i .

i = the number of alternative accounting methods.

n = the total number of companies.

Applying the formula to the example in the sub-section 'Multiple Reporting' in the situation without multiple reporting gives the following result:

$$C = \frac{1^2 + 2^2 - 3}{3^2 - 3} = 1/3$$

It is possible to relate the C index to the H index, because the latter can be stated as:

$$H = \frac{\sum_{i=1}^i a_i^2}{n^2} \quad (6)$$

So

$$C = \frac{H \times n^2 - n}{n^2 - n} = \frac{H - 1/n}{1 - 1/n} \quad (7)$$

When n reaches infinity: $C = H$.

If a financial report provides information based on more than one accounting method (multiple reporting), this financial report has to be subdivided into more than one class of financial reports. However, this means that the comparison between two financial reports which both supply information based on the same two or more accounting methods is counted double, triple or more because the comparison is counted in more than one class of financial reports. To avoid this double counting the number of comparisons between two financial reports based on the same two or more accounting methods should be deducted. The result is that the total number of compatible pairs is the same as described above in the case of no multiple reporting, except that a deduction is made to avoid double counting (analogous to Mood, Graybill and Boes, 1974, p. 24):

$$\begin{aligned} & 0.5 \sum_{j=1}^i (a_j^2 - a_j) - 0.5 \left(\sum_{j=1}^{i-1} \sum_{k=j+1}^i (a_{jk}^2 - a_{jk}) \right. \\ & + \sum_{j=1}^{i-2} \sum_{k=j+1}^{i-1} \sum_{l=k+1}^i (a_{jkl}^2 - a_{jkl}) \dots \\ & \left. + (-1)^{i+1} \sum \dots \sum (a_{j\dots}^2 - a_{j\dots}) \right) \end{aligned}$$

where $a_{jkl\dots}$ is the number of companies supplying information based on accounting methods j, k, l , et cetera and j, k and l are parameters fluctuating between 1 and i . This sum must be divided by the total number of possible comparisons $(0.5(n^2 - n))$. The result is:

$$C = \frac{\sum_{j=1}^i (a_j^2 - a_j) - \sum_{j < k} (a_{jk}^2 - a_{jk}) + \sum_{j < k < l} (a_{jkl}^2 - a_{jkl}) - \dots + (-1)^{i+1} \sum \dots \sum (a_{j\dots}^2 - a_{j\dots})}{n^2 - n} \quad (8)$$

Applying this formula to the earlier example with multiple reporting gives:

$$C = \frac{2^2 - 2 + 2^2 - 2 - 0}{3^2 - 3} = 2/3$$

Appendix 2: The I Index in the case of more than two countries

On p. 165 above the situation was described where two countries were compared. The I index is also applicable when more than two countries are compared. However, in this case the I index becomes very small because a large number of fractions are multiplied. This leads to a very unequal distribution of the I index over the interval 0 – 1.

To improve the possible application of the I index a correction factor should be built in, perhaps as follows. Where all accounting methods are applied with the same relative frequencies in every country, the addition of another similar country only leads to a small change in the I index. For example:

	Country		
	A	B	
Method I	0.5	0.5	$I = 0.5 \times 0.5 + 0.5 \times 0.5$
Method II	0.5	0.5	$= 0.5$

After the addition of country C (where half of the companies apply method I and the rest apply method II) the calculation of the uncorrected I index leads to:

	Country			
	A	B	C	
Method I	0.5	0.5	0.5	$I = 0.5 \times 0.5 \times 0.5$
Method II	0.5	0.5	0.5	$+ 0.5 \times 0.5 \times 0.5$
				$= 0.25$

The I Index with correction factor is: $I^x = I^{1/(m-1)}$ where m = the number of examined countries. In the example above the corrected I index would be: $I^x = 0.25^{1/2} = 0.5$. The addition of country C does not therefore lead to a change in the corrected I index.

The general formula of the I index is as follows:

$$I^x = \left(\sum_{i=1}^n (f_i^1 \times f_i^2 \times \dots \times f_i^m) \right)^{1/(m-1)} \quad (9)$$

where

f_i = relative frequency of method i in country m .

m = number of countries.

n = number of alternative accounting methods.

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The Information Economics Approach to Financial Reporting

Martin Walker

Abstract—This paper provides a non-technical overview of the literature on the economics of information and its implications for financial reporting. This paper attempts to spell out the unity of approach which underlies all information economics models and focuses on the main implications of the literature for accounting policy makers. The central section of the paper identifies precise conditions under which the provision of public information can lead to an improvement in social welfare. An understanding of these conditions is essential for policy makers if they are to take into account the economic effects of their decisions. The final section highlights three important unresolved issues and identifies promising directions for further research.

Introduction

Since the late sixties, researchers in information economics have made a number of important contributions towards our understanding of the role and value of information in capitalist economies. This literature is of considerable potential importance for accounting policy decisions which influence the timing, quality and quantity of public financial information. Unfortunately the information economics literature is mathematically forbidding and, to outsiders at least, gives the appearance of being somewhat fragmented. The purpose of this paper is to provide a non-technical overview of the economics literature as it relates to financial reporting.

The analytical method

Research in the information economics area to date has been primarily analytical, concerning itself with the value of information in hypothetical decision contexts. The analytical approach studies the behaviour of model economies under alternative information scenarios. For example, one might compare the behaviour of the economy in the absence of an information system with the behaviour of the economy in the presence of an information system. This kind of work is analogous to the modelling work of, say, engineers. For example, to test the wind resistance of a new car shape they construct a computer model designed to predict the likely resistance factors under alternative body shapes. Of course such models cannot capture all the relevant features of reality. At best they can only take into account the main factors likely to affect the final outcome. Nevertheless such models are useful because they help to structure the thinking of the design effort and because they often produce a working 'prototype' to which minor

modifications can be made to reflect the influence of the factors not taken into account by the model.

The key difference between engineering modelling and information systems modelling is the human element. The behaviour of inanimate objects like cars can be predicted on the basis of natural laws of wide validity. Unfortunately, from the modeller's point of view, the same cannot be said of the behaviour of human agents. Because of the human element the predictive success of economic models tends to be somewhat patchy, at least when judged by the standards used to assess the validity of the models of natural science. Nevertheless, when used properly, economic theory can provide a useful tool. In particular, analytical economic models are useful conceptual devices which help one to organise one's thinking about a problem. Moreover even though the predictive ability of economic models is poor, this does not imply that society would be better off without them.

Basic principles of neo-classical information economics

The information economics approach to accounting is based on the view that the demand for and supply of accounting information can and should be explained in terms of the choice behaviour of individuals. It is a scientific approach to accounting in the sense that its prime objective is to understand accounting practices and procedures.

The information economics approach is essentially neo-classical in the following sense (Hahn, 1984):

1. First, it is individualist in that it attempts to locate explanations in the actions of individual agents.

2. Second, it imposes strong assumptions with regard to the rationality of individuals. In particular almost all the information economics literature assumes that individuals choose as if to maximise their own expected utility.
3. Third, to the extent that it is concerned with the results of bargaining behaviour between individuals the approach focuses entirely on equilibrium positions, i.e. positions in which the intended action choices of individuals are mutually consistent and can be implemented.

Some social scientists (e.g. Marxists) reject individualism. Most economists believe it to be the approach most likely to lead to fruitful results. Ultimately acceptance of individualism is a matter of personal conviction.

The assumption of expected utility maximisation is more difficult to justify. Its main advantage is that it provides a mathematically convenient characterisation of individual choice behaviour that is often consistent with observed choice behaviour. Its main limitation, for present purposes, stems from the fact that it rules out *a priori* any possibility of information overload. It simply assumes that individuals make full and correct use of all information available to them.

With regard to the rationality assumption it should also be stressed that the assumption of rationality is an assumption about individual behaviour. It says nothing about the rationality of society as a whole or of the rationality of collective actions such as the actions of a firm.

At first sight the restriction of focus to equilibrium positions seems somewhat limiting. Certainly this would be so if by 'equilibrium' was meant 'competitive equilibrium under market clearing conditions'. In fact there is a whole variety of equilibrium concepts which can be fruitfully applied to the analysis of bargaining under uncertainty. Most of these equilibrium concepts are derived from the theory of games rather than the somewhat narrow field of competitive equilibrium theory (see e.g. Harsanyi, 1977; Shubik, 1982; Stiglitz & Weiss, 1983).

From a policy point of view there are two possible arguments against the information economics approach: that the perfect rationality assumption renders the approach useless because it is unrealistic; and that the approach is of no practical value because it focuses only on equilibrium positions.

Against the first of these criticisms it is important to note that even though particular individuals may exhibit irrational behaviour, nevertheless the information economics approach may yield the best predictions on average if the deviations from rationality are unsystematic and unpredictable. Furthermore, the rationality assumption

offers considerable advantages from a modelling point of view. As a practical matter, models based on rationality assumptions tend to be more tractable than models based on alternative behavioural assumptions. Against the second criticism one can argue that corporate reporting policy changes very slowly. Thus even though the predictions of information economics are valid only in the long run, this is not a practical weakness of the approach since the long run predictions of the theory are the ones most relevant for policy making.

Finally, we should note one other common feature of the information economics models reviewed below. All these models assume that most individuals exhibit a degree of risk aversion. This assumption motivates a demand for insurance and other forms of risk-sharing contracts.

Single person decision analysis

There are two novel features of the information economics approach which set it apart from earlier schools of thought. The first is that uncertainty is explicitly treated as a central feature of economic reality. This is in contrast to the more traditional schools of accounting thought which, at best, only treat uncertainty implicitly (*viz.* the prudence concept, extraordinary items, lower of cost or market value, etc.). The second is that information economics attempts to analyse the demand for and supply of information in a multi-person environment where conflicts of interest are prominent. Thus most recent information economics models are concerned with multi-person economies in an uncertain environment.

However, before examining these models, it will be helpful to begin by considering a simpler model involving just one individual in an uncertain environment. In this model uncertainty is represented by assuming that, at any point in time, the economy can be in one of several possible states of the world. Information is then represented as any device which helps one either to detect the current state of the world or to forecast its future state. For example consider the following decision problem of a farmer.

At the start of the year the farmer must decide whether to plant barley or potatoes. The profit he derives from his crop depends on whether the summer is wet or dry. The figures in the table show the farmer's profit under each weather/crop scenario. There are two alternative states of the world, 'wet' or 'dry'.

	Wet	Dry
	Summer	Summer
Plant Barley	£10,000	£50,000
Plant Potatoes	£30,000	£20,000

Suppose the farmer believes that there is an equal

probability of a wet or dry summer and that he wishes to maximise his expected profit, i.e. he is risk neutral. Then he will choose to plant barley since his expected profit from planting barley is £30,000 compared with only £25,000 if he plants potatoes.

Now suppose the farmer can purchase a perfect weather forecast before making his crop decision. In this case he will plant barley if the forecast is dry yielding a profit of £50,000 and potatoes if the forecast is wet yielding a profit of £30,000. His overall expected profit will be £40,000 which is £10,000 more than his expected profit in the absence of a perfect weather forecast.

The basic single person decision problem under uncertainty generalises the above example to allow for more than two states of the world and for forecasting systems which range between zero information and perfect information. To present this model formally, let $A = (a_1, \dots, a_N)$ represent a set of alternative actions. Suppose the consequence of an action depends on the state of the world. Let C represent the set of possible consequences and S represent the set of possible states. Let C_{ij} stand for the consequence of action i if state j occurs. Thus, for example, the consequence of the farmer selecting the action 'plant barley' if the state is 'wet' is £10,000.

Under a plausible set of axioms with regard to the rationality of the individual's ranking of consequences and acts, it can be shown that an individual will choose his act as if to maximise his expected utility. The expected utility of an act is defined as follows

$$EU(a_i) = \sum p_j U(c_{ij}) \quad (1)$$

where

$EU(a_i)$ = the expected utility of action i ;

$U(\cdot)$ = the utility function of the individual defined over consequences;

p_j = the subjective probability assigned by the individual to state j .

In the absence of information the individual will choose the action yielding the highest value of $EU(a_i)$. Let $EU(\text{no information})$ stand for the expected utility of the optimum action choice.

Information is represented in the model as a mapping from the set of states to a set of possible signals $Y \equiv (Y_1, \dots, Y_K)$. The signal is received by the individual before making his action choice. On receiving a particular signal the individual will first revise his prior subjective probabilities in the light of the information conveyed by the signal. Let p_{jk} stand for the revised probability of state j given signal k . Then the expected utility of action i given signal k is simply:

$$EU(a_i|y_k) = \sum_j p_{jk} U(c_{ij}) \quad (2)$$

The optimum action, given signal k , is the action with the highest value of $EU(a_i|y_k)$. Let $EU(y_k)$ be the expected utility of the optimum action, given signal k , that is:

$$EU(y_k) = \max_{a_i \in A} [EU(a_i|y_k)]$$

If we let p_k stand for the probability of receiving signal k , then the overall expected utility of the individual with access to information can be expressed as follows:

$$EU(\text{under information}) = \sum_k EU(y_k) \cdot p_k$$

An interesting feature of this model is that it can be used to assign a monetary value to information. In particular we can define the monetary value of information as the maximum amount of money that the individual with information would be able to pay in all states of the world and still remain as well off as he was without information. If we let $EU(\text{under information}, F)$ stand for the expected utility under information if the individual has to pay F for the use of the information, then the individual's willingness to pay for information can be represented as the value of F such that:

$$EU(\text{under information}, F) = EU(\text{without information})$$

The model can also be used to examine how individuals rank alternative information systems. An important result in this respect is the fineness theorem which states that for any information systems (A and B) all individuals will prefer the finer of the two information systems if one system is finer than the other. On the other hand if A and B are not comparable as to fineness then the ranking of the two systems may differ from individual to individual according to the details of their preferences/prior beliefs. In particular if A and B are not comparable as to fineness then there will be some configurations of preferences and beliefs which rank A and B and some which rank B above A . Detski (1973) was the first to recognise the importance of the fineness theorem for financial reporting policy. Many financial reporting alternatives are not comparable as to fineness. For example current cost accounts contain information which is not contained in CPP accounts and vice versa. The importance of the fineness theorem is the implication that any ranking of such non-comparable alternatives is consistent with individual rationality. Thus any attempt to prove that all rational individuals necessarily exhibit the same ranking of two or more non-comparable alternatives is doomed to failure. For example it is impossible to prove that no rational individual would prefer CCA to CPP or vice versa.

A second general point to emerge from the single person model is recognition that the demand for

information in this model relates only to a demand for state of the world forecasts. Conventional accounting statements such as balance sheets and income statements have no value in this context.

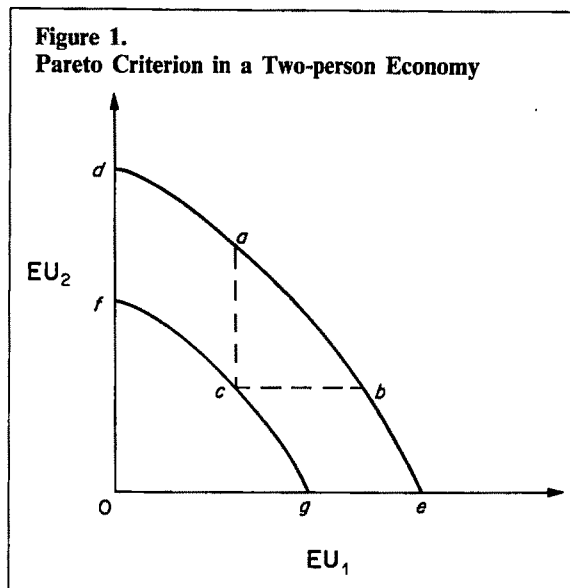
The value of public information in a social context

If the main purpose of corporate reporting is to provide public information to investors relevant for economic decision making and control then it is important to understand how public information affects the decisions and welfare of individuals and society as a whole. Ideally one would like to be able to perform a cost-benefit analysis of financial reporting alternatives but at present this seems to be an unattainable goal. More realistically it seems sensible to attempt to identify the potential sources of costs and benefits, and the possible distributional consequences of financial reporting alternatives. This will provide a kind of 'conceptual framework' within which rational debate can take place.

Information economics has made a number of important advances in understanding the potential benefits of public information. The purpose of this section is to review these advances.

Before analysing the social value of information it is important to define what it means to say that a public information system has social value. By analogy with the single person case reviewed in the previous section the definition of social value employed below involves a comparison of the expected utilities of all individuals in the economy without information with the expected utilities of all individuals in the economy with information. In particular, we will say that an information system is of potential social value if, in the economy with the information system, it is possible (perhaps following some lump sum redistribution) to increase the expected utility of at least one individual without reducing the expected utility of any other individual relative to the expected utilities that the individuals would have had in the economy without the information system. This is the Pareto Criterion, an idea which can be explained by reference to Figure 1 which assumes a two-person economy.

In Figure 1 the horizontal axis measures the expected utility of individual 1 and the vertical axis measures the expected utility of individual 2. The curve fcg represents the Pareto frontier of the economy in the absence of information. In other words every point on the curve fcg shows the maximum level of EU_2 that can be achieved for a given level of EU_1 . For example if individual 1 achieves an expected utility of $0g$ the expected utility of individual 2 will be zero. The curve $dabe$ represents the Pareto frontier of the economy in the presence of information. Here we have as-



sumed that the introduction of information shifts the Pareto frontier of the economy outwards, i.e. information has social value.

Recent theoretical research on the economics of information has made important advances for our understanding of the social value of public information. The essential features of these advances can be explained by reference to a simple model economy with the following characteristics:

- (i) there is a given set of I consumers,
- (ii) there is a given set of J firms,
- (iii) there is a single commodity,
- (iv) the life of the economy is a single period,
- (v) uncertainty is represented by assuming that the economy can be in one of S possible states of the world at the end of the period.

The following additional assumptions define a special case of this model which provides a useful starting point for our discussion of the social value of public information:

1. each consumer is a risk averse expected utility maximiser,
2. the utility function of each consumer is time additive,
3. consumers have homogeneous prior beliefs,
4. all economic agents have equal and costless access to information,
5. each firm has an exogenously given production plan,
6. the market for firm specific securities and claims to immediate consumption is both perfect and complete.

Implicit in assumption 6 is the idea that trade takes place only in firm-specific securities written against the end of period payoffs of the J firms. These securities can be traded against each other or

against claims to immediate consumption. The assumption of a perfect market guarantees that all economic agents behave as price takers with respect to security prices and the risk-free rate of interest. The end-of-period production of each firm is an S -dimensional vector of state contingent payoffs. The S by J matrix formed by the J firm-specific production vectors will be referred to here as the end-of-period payoff matrix. The 'completeness' part of assumption 6 is equivalent to requiring the end-of-period payoff matrix to be of full row rank. This rank condition ensures that the J firm-specific production vectors span the entire S -dimensional space of end-of-period payoff patterns. Thus, within the limits of his wealth, each consumer can achieve any end-of-period consumption pattern he desires. Moreover, given price-taking behaviour on behalf of consumers, all consumers will prefer more wealth to less.

The concept of information in this model can be represented as any device which either helps economic agents to predict which state of the world is going to occur or which helps economic agents to determine which state has occurred. Beaver and Demski (1979) refer to the former type of information as pre-decision information and the latter type as post-decision information.

It is possible to prove the following propositions (see e.g. Ohlson and Buckman, 1981):

Proposition 1

Given assumptions 1 to 6 inclusive, information has no social value in the sense that the Pareto efficient frontier of society is not affected by the introduction of information into any economy characterised by assumptions 1 to 6.

Proposition 2

In an economy for which assumptions 1 to 6 hold, if pre-decision information is introduced *after* consumers have had a preliminary opportunity to trade, no consumer will wish to retrade following the release of information and there will be no effect on the welfare of any consumer.

Proposition 3

The introduction of pre-decision information into an economy characterised by assumptions 1 to 6 before consumers have had any opportunity to trade can never result in a strict Pareto improvement and may result in every consumer being strictly worse off.

The intuition behind propositions 1 and 2 becomes clear when one recalls that the aggregate amounts of immediate consumption and state contingent end-of-period consumption are given exogenously. Thus information, at best, can only affect the distribution of claims between consumers. However assumption 6 guarantees that a

Pareto efficient allocation of claims will be achieved in the absence of information whilst assumptions 2 and 3 ensure that there will be no demand to alter the distribution of claims following the release of new information.

Proposition 3 can be understood by considering a simple example involving two consumers, two states, and two firms with the following end-of-period payoff matrix:

	State 1	State 2
Firm 1	0	100
Firm 2	100	0

The example assumes that the two consumers have identical utility functions and identical endowments of immediate consumption. In addition both consumers believe the two states are equally likely. Consumer 1 owns the whole of firm 1 and consumer 2 owns the whole of firm 2. In the absence of pre-decision information the two consumers will agree to trade 50% of firm 1 against 50% of firm 2.

Now consider the effect of a perfect pre-decision information system with the signal being released before the consumers have had an opportunity to trade. If state 1 is signalled, consumer 2 will hold on to his endowment and consumer 1 will receive nothing. Similarly consumer 2 will end up receiving nothing if state 2 is signalled. Since state 1 and state 2 are equally likely, both consumers will have a lower expected utility than they would have had in the absence of information. This deleterious effect occurs because the release of information induces a revaluation in the initial endowments of the consumers before they have had an opportunity to insure themselves by trading to a less exposed position.

So far then we have identified no source of social benefit from public information and one potential source of social cost. We will, therefore, have to relax at least one of the assumptions 1 to 6 to produce a model economy in which information has social value. In fact, by relaxing any one of assumptions 1 to 6 it is possible to construct model economies in which the provision of public information leads to a strict Pareto improvement. Assumptions 1 to 6, therefore, are both necessary and sufficient for information to have no social value.

Now if we wish to conduct our analysis within the mainstream tradition of neo-classical financial economics we must retain the first assumption. Most of the published literature on the economics of information also retains the assumptions 2 and 3 (Hakansson, Ohlson and Kunkel 1982, present an analysis of an equilibrium model in which assumptions 2 and 3 are relaxed).

The remainder of this section, therefore, focuses on the implications of relaxing assumptions 4, 5 and 6 for our understanding of the social value of public information.

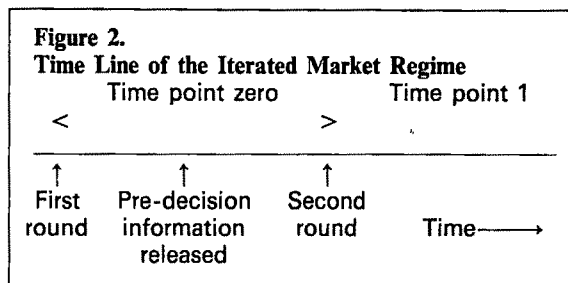
Within the class of models which retain assumptions 1 to 3 it is possible to show that public information has potential social value in model economies which relax any one of assumptions 4, 5 and 6. In model economies where market structures are incomplete (i.e. assumption 6 does not hold) public information may lead to improved social welfare if it facilitates the creation of new trading opportunities or new tradeable securities. We will refer to this possibility as the 'completion of markets' role of information. In model economies where production decisions are endogenous, public pre-decision information can lead to improved production investment decisions. Finally, in model economies in which assumption 4 is relaxed, social costs can arise when individuals have asymmetric access to information. The provision of public information, by removing or reducing such asymmetries, can serve to eliminate or reduce such costs. The remainder of this section examines these three possibilities in more detail.

To illustrate the 'completion of markets' role of information, consider a model economy involving just two identical individuals and three states with state contingent endowments as follows:

		S_1	S_2	S_3
		$\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{3}$
Prior beliefs:				
Endowments:	Individual 1	100	0	0
	Individual 2	0	100	0

Now if the state of the world is observable *ex post* by both parties they will be able to agree to share the aggregate payoff equally in state 1 and state 2. Their ability to enforce this agreement would vanish if the state of the world was not observable *ex post*. For example, if the individuals could only observe the information implicit in their own endowment no trade would be possible. Hence we can see that information relating to the state of the world may be useful insofar as it increases the set of risk-sharing opportunities.

Recent research has shown that an increase in the set of risk-sharing opportunities can be achieved in two alternative ways. One possibility is to increase the fineness of the post-decision information system and to expand the set of state contingent contracts to take advantage of the improved post-decision information. Here by 'the post-decision information system' we refer to information relating to the state of the world released at time point 1. Four points should be noted about this post-decision role of information. First, only information which is available to all parties to the contract can satisfy this role. Second, this role does not involve prediction. It simply involves *validation* of the actual state occurrence. In this sense it is probably more akin to what most lay people would regard as the proper role of accounting, i.e. the reporting of the 'facts'. Third, even though state prediction is not involved, the parties to the con-



tract must be able to rely on the information being released *ex post* otherwise they will not be able to base a contract upon it. Fourth, the observable effect of an improvement in the post-decision information system is an increase in the variety and complexity of risk sharing contracts. Amershi (1981 and 1985) and Strong and Walker (1987, chapters 3 and 4) contain detailed discussions on the 'completion of markets' role of post-decision information.

Ohlson and Buckman (1981) have focused on an alternative way of increasing the set of risk-sharing opportunities. This can be achieved by releasing additional pre-decision information (i.e. at time point zero) followed by an additional round of trading. Figure 2 illustrates the time line of the Ohlson/Buckman iterated market regime.

Under the Ohlson/Buckman approach the number of securities is held constant and the market is made more complete by allowing a further round of trading in the same set of securities following the release of pre-decision information. In comparison the post-decision information approach involves only a single round of trading but the set of tradeable securities is expanded as the fineness of the post-decision information system is increased.

Social benefits from the provision of public information may also arise where society has some control over the state contingent distribution of aggregate output, for example if society can trade output in one state against output in another, or if current output/leisure can be traded against future output/leisure. If, for example, society could forecast precisely which state was going to occur then resources could be moved into those activities which offered the greatest return in the light of the information received. (Kunkel, 1982, provides a formal demonstration of this possibility.) It is important to note that this type of benefit only arises to the extent that *real* production/investment decisions are affected by the information. To detect such influences one really needs to look at the effect of information on employment and real investment decisions. Changes in share prices and changes in the portfolios of individuals provide, at best, only indirect evidence with regard to these real effects. Finally, it should be noted that only pre-decision information is useful for this particular purpose.

The third major scenario under which public information can be of potential social value occurs when some individuals have access to private information or private information production opportunities. The economics of information has focused on two main types of information asymmetry, i.e. investor/investor asymmetry and outside investor/manager asymmetry.

The investor/investor case of information asymmetry refers to the possibility that some investors may have access to private information or private information production opportunities. This possibility was first examined rigorously by Hirshleifer (1971) and Fama and Laffer (1971). The main point to emerge from their analyses was that situations can arise when there are considerable private benefits to private information production even though the social benefits are zero. Marshall (1974) noted that this possibility provides yet another rationale for the public provision of information. If such information can be produced more cheaply than the aggregate amount spent on private information then public information will be beneficial to the extent that it leads to the attenuation of private information production. The precise details of these arguments have been criticised because they assumed that the relatively uninformed investors would simply react passively to price signals even though they would be aware that they were likely to be 'fleeced' by the informed investors. In recent years a number of models have been developed which assume a greater degree of sophistication on behalf of the uninformed investors. Relying heavily on the assumption of rational expectations, these models show that the uninformed may be able to infer some (and in some cases all) of the information available to informed investors from the behaviour of market prices (e.g. Grossman 1976 and 1981; Grossman and Stiglitz, 1980; Hellwig, 1980; Jordan and Radner, 1982; Radner, 1968 and 1979).

The question we now need to consider is whether there would be any social benefit to public information production where all individuals form their expectations rationally and take full advantage of the information reflected in market prices. Papers by Verrecchia (1982) and Diamond (1985) show that there will still be social benefits from the provision of public information so long as privately produced information is less than fully reflected in market prices, i.e. so long as the rational expectations equilibrium is a noisy one. As in the Marshall (1974) paper, the social benefit from public information production stems from the reduction of socially wasteful expenditure on private information production.

The case of outside investor/manager information asymmetry is an issue which has cropped up from time to time in the literature on the economic theory of the firm under the rubric of 'Separation

of Ownership from Control'. The economics of information has focused on two main issues within this context. First there is a class of models known collectively as 'Agency Theory' which basically deals with the issue of how to motivate managers to take decisions consistent with the interests of outside investors. In all such models the manager has a number of decision variables under his control which are not directly observable by outside investors. In some models the manager also has access to additional private information at the time he makes his decision choice. An agency problem arises where the manager's preference ranking over alternative levels of the decision variables differs from that of the shareholders. The literature often refers to such quaint decision variables as the level of expenditure on perquisites or the manager's level of effort, but there are other, possibly more important, decision variables over which conflicts of interest can arise. For example, the manager and shareholders may disagree over what kinds of project risk are acceptable. From time to time the manager may find himself in a position where he would become a social leper by adopting the decision which maximises his shareholders' wealth (investment in South Africa for example).

The principal-agent literature has identified two major problems which arise in an agency context: the moral hazard problem and the adverse selection problem. A moral hazard problem arises when the action choice of the agent is unobservable and when the preference rankings of the principal and the agent over alternative actions diverge. An adverse selection problem arises when the agent has access to pre-decision information which is not observed by the principal. The agent uses his private information in making his action choice but the principal cannot verify whether the agent has used his information in the way that best serves the principal's interest. For example, a company manager might reject a project because of its high risk even though its acceptance would increase the market value of the firm. Outside shareholders would be unlikely to detect such a decision. Both the moral hazard problem and the adverse selection problem can be overcome by the provision of improved post-decision information. If the post-decision information system allows the principal to infer the agent's action choice then a 'forcing contract' can be used to force the agent to adopt the principal's desired action (a forcing contract is one that imposes a very high penalty on the agent if he deviates from the desired action). Similarly if the principal can infer both the agent's choice and the agent's pre-decision information a signal contingent forcing contract can be used to overcome the adverse selection problem. The asterisked articles in the bibliography will provide a useful basis for anyone wishing to pursue the topic in

greater depth. For a useful introduction to the main ideas the reader should consult Pratt and Zeckhauser (1984) and chapter 8 of Strong and Walker (1987). Atkinson and Feltham (1982) and Watts and Zimmerman (1986) examine some of the implications of agency theory for financial accounting.

The second major class of issues that arise when managers have access to superior information is the question of whether managers will have an appropriate incentive to reveal truthfully their private information to outside investors and the related question of whether any costs will be incurred in communicating this information. The two main types of models used to examine these issues are known as 'signalling' and 'screening' models. Both types of models are game theoretic in nature and both involve two types of agents, i.e. informed insiders and uninformed outsiders. Stiglitz and Weiss (1983) have shown that the main differences between the two models stem from the fact that the informed have the first move in signalling models whilst the uninformed have the first move in screening models.

A paper by Leland and Pyle (1977) provides a useful illustrative example of a signalling model. In their model, inside owner managers observe private information about the future prospects for an investment project (the only project available to the firm). The owner managers decide whether or not to undertake the project and what proportion of their personal wealth to put into the project. If all owner managers were forced to hold the same proportion of their wealth in their own project there would be no way for them to communicate credibly their information to the market, since all the managers would have an incentive to claim that the prospect for their project was good to enhance the value of the company's shares. However, when managers are free to choose what proportion of their wealth to put into their own project their choice provides a credible signal to the market about their degree of confidence in the project's success. Assuming the manager is risk-averse, holding a large proportion of his wealth in his own firm is costly because it increases his risk. Only managers who are truly confident about the firm's prospects will be willing to accept such risks. However, whilst managers are able to communicate their information credibly (via their portfolio choice decision) there are real costs involved in signalling the information to outsiders. In particular, relative to a situation where all information is publicly available, the inside managers lose out to the extent that their portfolios are imperfectly diversified. These managers would, therefore, be willing to pay for any device which would allow them to communicate their private information credibly without a need to commit a large proportion of their wealth to a single project.

Articles on signalling and screening frequently draw a distinction between dissipative and non-dissipative signalling equilibrium. This distinction basically involves a comparison of the Pareto frontier of society when all individuals have costless access to all relevant information (the first-best frontier) with the Pareto frontier of society when there is unequal access to information and communication is achieved via market signalling/screening. In essence a signalling equilibrium is said to be non-dissipative if the vector of expected utilities of all individuals in that society is a point on the first-best frontier; otherwise the equilibrium is said to be dissipative. Public information has social value in a signalling context if it allows the replacement of a dissipative equilibrium by a non-dissipative equilibrium or if it allows the replacement of one dissipative equilibrium with another dissipative equilibrium with lower aggregate signalling costs. Again it is important to note that public post-decision information is capable of providing a non-dissipative solution to the signalling problem. In particular if the public post-decision information is at least as fine as the pre-decision information system of the insider manager, then a simple forcing contract can be used to induce the manager to reveal his information truthfully. More generally, provided there are no limits on the penalties one can impose on managers, one will always be able to design a contract to induce truth-telling behaviour provided there is a positive probability that any lie by the manager will be detected by the post-decision information system.

Spence (1976) provides a useful introduction to the basic ideas of signalling and screening theory. Ross (1977), in one of the earliest applications of signalling theory to financial theory, presents a non-dissipative signalling model of the capital structure decision. Bhattacharya (1980) presents a non-dissipative signalling model of the dividend decision. Miller and Rock's (1985) treatment of the dividend decision involves a dissipative signalling equilibrium. Stiglitz and Weiss (1981) use a screening model to explain the phenomena of credit rationing. Ross (1979) examines the implications of signalling theory for the debate on disclosure regulation and Bar-Yosef and Livnat (1984) use signalling theory to model the market for auditors.

In principle, the kind of forcing contracts that can be used to eliminate agency and signalling costs can also be used to overcome the problems arising from investor/investor information asymmetry. If the public post-decision information system can identify the pre-decision information of traders, then the less informed can protect themselves by insisting on an insurance contract which requires the other party to the trade to pay a penalty if the post-decision information system shows that the other party traded on the basis of insider information.

In summary there seem to be five main sources of social benefit from public information:

1. to extend the range of trading opportunities with a view to improved risk sharing,
2. to improve real production/investment decisions,
3. to reduce expenditure on private information production,
4. to improve control over management decisions,
5. to reduce the costs of signalling inside information to the market.

The surprise to emerge from this survey is recognition that four out of five (the exception being item 2) of these benefits can, at least in principle, be achieved on the basis of improved post-decision information linked to a sophisticated range of public information signal contingent claims contracts. This may be good news for those who believe that accounting is essentially about the reporting of 'facts' for stewardship purposes, especially if one interprets 'stewardship' broadly as the provision of information for 'contract enforcement'.

Some unresolved issues

Three issues remain unresolved by the information economics literature:

The Nature of Income Measurement

The models reviewed in the previous sections all represented an information system as some kind of mapping from states of the world to a set of signals. The reader may well be wondering what this has to do with accounting. Accounting provides various kinds of statements to investors, such as earnings statements and balance sheets, but it is not obvious that any of these represent an information system in the sense defined above.

A paper by Beaver and Demski (1979) attempted to apply the insights of information economics to income measurement. Their paper established the following main points:

1. In a world of perfect and complete markets all shareholders will exhibit unanimous rankings over a firm's alternative production plans. This ranking will correspond to the ranking given by the market valuations of the alternative production plans.
2. Given the firm's production plan and a complete set of state contingent prices, one can construct an (*ex ante*) measure of economic income. The ranking of production plans induced by this income measure will be identical to the ranking given by the market valuation of the alternative production plans. Hence a fundamental income measure (in the

sense that all shareholders prefer more income to less) will exist.

3. If markets are perfect and complete even though an income measure exists, its publication will be of no social value because investors have all the information they need for decision-making purposes if they know the firm's production plan and the set of state contingent prices.
4. If markets are incomplete, shareholders may differ in their rankings of alternative production plans in which case a fundamental income measure will not exist.
5. Whether or not income reporting is socially desirable depends on its ability to produce cost effective communications between the firm and its shareholders and not on its properties as a fundamental income measure.

In concluding their paper Beaver and Demski wrote:

... the case for income rests on the assumption of aggregating more informative but also more costly data such that a cost effective communication is obtained. However this assumption is problematical and, in our view, one challenge to accounting theorists is to address the primitive question of the propriety of the accrual concept of income.

The idea that any attempt to explain financial reporting practices must be capable of demonstrating a willingness to pay on behalf of investors for financial reporting has been well received and never seriously challenged. Moreover their 'costly communications' perspective has exerted some influence on other income measurement scholars. For example, Parker *et al* (1986) included the Beaver and Demski paper in their influential book of readings and highlighted it as a major contribution to the theory of income measurement.

For income measurement theorists the most challenging feature of the Beaver and Demski article is their claim that the propriety of accruals-based income reporting as a cost effective communications device is yet to be demonstrated. In other words a cost/benefit rationale for accruals-based income reporting has never been established and, in particular, the search for a neo-classical equilibrium model which exhibits an endogenous demand for accruals-based earnings measures has, so far, proved fruitless. The construction of a satisfactory response to this challenge stands out as a major unresolved item on the income measurement research agenda.

On Commercial Sensitivity

Commercial sensitivity is often advanced by firms as a reason for resisting demands for in-

creased financial disclosure. Given the importance of such arguments in the policy domain, it is unfortunate that commercial sensitivity has received little attention either from accounting theorists or from empirical researchers.

The limited amount of theoretical work that has been done suggests that some of the commercial sensitivity arguments are spurious, at least when viewed from the perspective of society as a whole.

Consider, for example, the case of financial disclosures to employees. Some scholars have suggested that information disclosure in a collective bargaining context may 'have adverse distributional effects from the management's point of view' (Foley and Maunders, 1977). Pope and Peel (1981) have questioned this argument. They argue that, if trade union representatives form their expectations rationally, any item of information not supplied by management will be replaced by their own unbiased estimate of that item. Sometimes the estimate will be too high and sometimes it will be too low but on average they will get it right. Hence if management does disclose the data item the only effect will be to reduce the variance of the union's forecast error. Pope and Peel argue that, in the absence of cost considerations, this reduction in variance can only be beneficial to the bargaining process.

Also from a policy point of view it is important to bear in mind that one firm's loss due to commercial sensitivity may well be offset by gains to other firms. For example, a firm may lose out to its competitors by obeying a requirement to disclose its profit margins but it will gain from the same disclosure requirement being imposed on its competitors. Moreover, even though individual firms may suffer a net loss as a result of increased disclosure, such losses may be acceptable to its shareholders if they also hold shares in the firms which benefit from these disclosures.

Finally, it is worth noting that situations can arise when all firms in an industry would unanimously prefer increased disclosure even though this would reduce the welfare of society as a whole. This logical possibility has been demonstrated in a recent paper by Fried (1984) in the context of a duopolistic industry where each firm has access to private information about its own cost conditions. He shows that each firm will be motivated to disclose this information publicly and that the industry as a whole will be more profitable as a result of the improved co-ordination of the two firms' output levels. In effect the industry is able to restrict aggregate output to lower levels than it would be in the absence of disclosure. The reduced output level yields higher profits for both firms at the expense of the hapless consumer.

Regulation

A previous section of this paper identified the

main potential sources of social benefit from the provision of public information. None of these arguments, however, in and of themselves, provide any justification for the regulation of financial reporting. The purpose of this section is to review the economic arguments for and against regulation.

There are two main lines of approach to establishing a case in favour of the regulation of financial reporting. One is to argue for regulation on equity grounds. For example, it might be argued that enhanced financial disclosure protects small investors (see e.g. the AICPA report on the objectives of financial statements). There is some scope for further research on such equity arguments. On the one hand it would be of interest to find out whether equity judgements have played a significant role in the determination of any accounting standards and, if so, to articulate the ethical judgements of standard setters. There may also be scope for normative research in this area. Rawls's Theory of Justice, Harsanyi's Utilitarian Theory of Ethics, and economic theories of fairness/superfairness, all offer interesting perspectives on the ethical issues faced by standard setters. However, at the end of the day one must always bear in mind that the government has plenty of other tools at its disposal for influencing the distribution of wealth. It may therefore be sensible for policy makers to focus on technical and efficiency arguments in their deliberations over financial disclosure alternatives under the assumption that the distributional effects can be taken care of by other policy instruments.

Several recent papers and monographs discuss the market failure arguments for regulation (see e.g. Gonedes and Dopuch, 1974; Leftwich, 1980; Beaver, 1981; Benston, 1983; Bromwich, 1985; Taylor and Turley, 1986). The argument most frequently advanced by this literature in favour of regulation is that information appears to exhibit the classic properties of a public good in the sense that it is costly to exclude non-purchasers from its use and the use of information by one user does not exclude its use by another. This argument has been questioned by Bird and Locke (1981) who noted that it may be possible to overcome the public good problem by divorcing the rights to receive information about a firm from the other ownership rights of its shareholders. Groups of investors would be allowed to form 'clubs' to purchase exclusive information from the firm. Similar arguments have been advanced by Gonedes *et al* (1974). The Bird and Locke argument, however, seems to ignore the possibility that individual club members will have an incentive to resell their information to non-members.

Another frequently cited rationale for regulation is that the public provision of information reduces the level of socially wasteful private information

production. This has been demonstrated in the models of Diamond and Verrecchia mentioned above. However, the demonstration that public disclosure leads to the attenuation of private information production does not provide sufficient grounds for regulation. In the Diamond model, for example, investors unanimously agree on the optimum amount of public information production without the need for any form of regulation. In a recent review of this literature Watts and Zimmerman (1986) argue that all the currently published market failure arguments in favour of regulation reduce ultimately to unsubstantiated claims that government contracting costs are lower than private contracting costs. Watts and Zimmerman conclude that, in the absence of empirical evidence on the relative costs of private and government contracting, there is no clear justification for the regulation of financial reporting.

The ideas discussed in the previous section may ultimately lead to more sophisticated analyses of the regulation issue than those criticised by Watts and Zimmerman. In particular, recognition of the importance of reliable post-decision information as a pre-condition for the existence of sophisticated risk-sharing arrangements and incentive structures leads to a different conception of the purpose and effect of regulation in relation to market forces. Often advocates of regulation are portrayed as being unsympathetic to the market economy. The very word 'regulation' carries connotations of bureaucratic bumbling. The ideas discussed in the previous section, however, lead to an alternative conception of regulation oriented towards the creation of markets which otherwise would not exist. Thus, far from operating as a drag on the workings of the free market, regulation can serve to release the market's full potential.

Concluding remarks

The economics of information has proved useful in refining our understanding of the social benefits of information and in highlighting the distinction between the private and social benefits of information. Furthermore, the possibility that many of the social benefits of information can be achieved by using post-decision information as a basis for improved risk-sharing is an important contribution which goes some way to narrowing the divide between information economists and accountants of the 'stewardship' school.

There are, however, a number of areas where the approach is, at best, inadequate. First, we have no satisfactory theory of commercially sensitive information. Further research on this topic is urgently required. Second, the theoretical arguments for (and against) regulation are woefully underdeveloped. Finally, and most worrying of all, the conceptual framework of information economics

does not interface well with the accounting framework. As yet we have no rigorous model of an economic equilibrium in which rational individuals would be willing to pay for accruals-based earnings.

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The Association Between Client Factors and Audit Fees: a Comparison by Country and by Firm

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Abstract—This study investigates whether the factors identified by prior research as being associated with intra-country Big Eight audit fees are consistent (i) among countries (across the Big Eight) and (ii) among Big Eight auditing firms (across countries). Fees from 410 audits in five countries were analysed. Results indicate a similarity in the influence of client size and complexity variables among four of the five country audit-fee models and among seven of the Big Eight audit-fee models.

Studies of the pricing of audit services in several English-speaking countries have identified country-specific audit-fee models and found variables pertaining to a client's size and complexity consistently associated with a company's audit fee. However, such studies have not focused on inter-country audit-fee models nor on determining if consistent pricing strategies occur among Big Eight auditing firms *across* countries. Therefore, the purpose of this study is to investigate whether the factors identified by prior research as being associated with intra-country Big Eight audit fees are consistent (i) among countries (across Big Eight auditing firms) and (ii) among Big Eight auditing firms (across countries).

Prior studies

Prior studies provide a useful list of potentially significant variables for investigating audit fees on an international scale. While little consensus exists as to which specific variables are the most significant, a size measure and a complexity indicator are the most frequently cited significant independent variables.

Bavishi and Wyman (1983) provide comprehensive descriptive summaries of international audit fees in the reference manual *Who Audits the World*. In addition, they analysed audit-fee data pertaining to Australian and UK companies in an attempt to identify important explanatory factors. Their best regression models for these two countries had R^2 values greater than 70%. These models used the ratio audit-fee/size (where size equals the client's total assets plus sales) as the dependent variable and measures for the client's (i) auditor, (ii) industry, (iii) multinational status, and (iv) total assets plus sales as the independent variables.

Tests of significance were not reported for these individual variables. The last three variables pertain to size and complexity measures of the companies. The 'auditor' variable pertained to categorical groups of audit firms (i.e. Big Eight v non-Big Eight) and the fact that it was included begins to suggest the possibility of different pricing strategies among the auditing firms.

Francis (1984) pursued a similar quest for explanations of audit-fee differences in a study of 136 Australian companies from 1974 to 1978. Using regression analysis, he identified four significant independent variables (out of ten) that explained 73.5% of the variance (R^2) for an audit-fee dependent variable. The independent variables were (i) a log transformation of the client's total assets, (ii) a square root transformation of the client's number of subsidiaries, (iii) the client's percentage of current assets to total assets, and (iv) a binary variable for a Big Eight or non-Big Eight auditor. The first and second variables again reflect the association of client size and client complexity with audit fees.

Taylor and Baker (1981) had similar results. They investigated 126 UK manufacturing companies in an attempt to identify the significant factors associated with their external audit fees for 1976 and 1977. Using multivariate factor analysis, 13 potential independent variables were loaded on to two distinct factors. A variable for total assets (size) and one for number of subsidiaries (complexity) were noted as the dominant components in one or the other of the two factors. These two variables were included in a regression model, with audit fees as the dependent variable, and were both found to be significant, explaining 79% of the variance (R^2) in fees.

Firth (1985) analysed the audit fees for 96 New

Zealand manufacturing firms using 1981 and 1983 as the test period. The results of his regressions were that four variables—(i) the square root of client total assets, (ii) the ratio of client accounts receivable to total assets, (iii) the existence of current cost accounts to be audited, and (iv) a measure for the unsystematic risk of the client—explained 72% of the variance (R^2) of the sampled audit fees. Again, client size was a significant determinant of audit fees. A binary dummy variable indicating that the audit firm was one of the Big Six or not was found to be insignificant, as was a complexity variable (number of subsidiaries).

In addition, size and complexity are clearly significant variables in studies by Simunic (1980), Palmrose (1986), Wallace (1984), Maher, Broman, Colson and Tiessen (1985), and Simon (1985); all of whom performed research on the determinants of audit fees for US firms.

Hypotheses

Nair and Frank (1980) believe that there has been a harmonisation in worldwide accounting practices. Hemp (1985) attests to this observation also, ascribing its rise to the initiatives of the international companies themselves. He believes that, as more and more large foreign companies have decided to raise funds in world markets, especially in the US, they have had to adopt financial reporting practices acceptable to those markets.

In an extensive study using data on 267 accounting practices in 64 countries conducted for the purpose of documenting such assertions as those noted above, Nair (1982) identified seven clusterings of countries based on accounting measurement practices and ten distinct groups based on accounting disclosure practices. Most pertinent to the present study is the fact that Australia (AU), New Zealand (NZ), Ireland (IR), and the United Kingdom (UK) were grouped together in both instances. Moreover, even though the United States (US) was not statistically a member of this group, Nair (1982) and Hussein, Bavishi, and Gangolly (1986) both report that the US and these four countries possess a number of important similarities in their economic and professional accounting environments (e.g. financial statements aimed primarily at investors operating in organised capital markets, origins of current legal systems, codification of auditing standards, licensing, etc.).

Because of (i) this documented similarity in accounting practices and environments, (ii) the international focus for expansion adopted by the largest US-based auditing firms (Arpan and Radebaugh, 1981; Belfi, 1975; Wu and Hackett, 1977), and (iii) the increased number of foreign multinationals seeking to raise capital in world markets

and employing international audit firms (Hemp, 1985; Arpan and Radebaugh, 1981), it is hypothesised that the external corporate audit fees for the larger companies in these five countries are also similar. Therefore, the following null hypothesis is posed:

H₁: No difference exists in audit-fee pricing models among the US, the UK, IR, NZ, and AU (across Big Eight audit firms).

The second hypothesis tested here is based on the theory that the pricing of audit services is a primary means by which audit firms differentiate themselves in an industry where product differentiation is not readily observable (Simunic, 1980). To date, the only evidence of pricing differentiation based on audit-fee data has been conducted in a Big Eight versus non-Big Eight context. Francis (1984), Taffler and Ramalinggam (1982), and Palmrose (1986) found Big Eight audit fees to be higher than non-Big Eight fees in AU, the UK and the US. In another US study, Simunic (1980) found the opposite. In the only study we are aware of comparing firms *within* the Big Eight, Shockley and Holt (1983) found a statistically significant difference in the perceived expensiveness of the various Big Eight firms. Based on the argument of price differentiation, the second hypothesis, stated in the null form, is:

H₂: No difference exists in audit-fee pricing models among the Big Eight audit firms (across countries).

In testing these two hypotheses, this study differs from prior research in two significant ways. First, it incorporates a multinational sample, which permits investigation of audit-fee similarities among and across countries. Second, the audit-fee data are partitioned according to Big Eight accounting firm, in order to investigate if audit-fee models are firm-specific.

Methodology

The Sample

Companies from five countries (AU, IR, NZ, UK and the US) were selected for investigation, based on the following criteria:

- (1) a sample of at least 30 companies per country was available;
- (2) actual audit-fee data were available in either *Who Audits the World*, annual reports, or proxy statements for the test period, 1979–1981;
- (3) financial data were available in either *Moody's International Manual*, *COMPUSTAT*, or annual reports; and
- (4) the company had been audited by a Big Eight auditing firm or a Big Eight affiliate.

Table 1
Descriptive Sample Statistics

		<i>Australia</i> (<i>n</i> = 67)	<i>Ireland</i> (<i>n</i> = 32)	<i>New Zealand</i> (<i>n</i> = 33)	<i>UK</i> (<i>n</i> = 170)	<i>US</i> (<i>n</i> = 108)
<i>Audit Fees</i>	-Mean	405.8	92.9	240.4	512.1	1,032.2
	-Std. Dev.	360.0	109.5	184.2	542.7	1,467.7
<i>Assets</i>	-Mean	858.8	425.0	425.2	753.1	7,666.2
	-Std. Dev.	2,275.3	1,244.0	922.5	2,272.1	20,512.3
<i>Sales</i>	-Mean	546.5	213.7	362.1	619.3	4,348.3
	-Std. Dev.	629.3	415.7	403.2	952.3	8,987.2
<i>Receivables</i>	-Mean	303.1	215.4	167.7	309.6	2,748.7
	-Std. Dev.	1,407.0	780.2	613.9	1,695.5	10,131.5
<i>Net Income</i>	-Mean	24.6	6.8	10.7	30.5	172.9
	-Std. Dev.	36.9	9.8	21.8	76.7	708.2
<i>Subsidiaries</i>	-Mean	24.3	17.6	17.8	31.2	33.2
	-Std. Dev.	23.6	12.9	11.0	27.8	35.1
<i>Manufacturing</i>		43	19	18	110	60
<i>Multinational</i>		31	11	9	126	50

Note: All figures are presented in the local currency. Monetary amounts are millions, except for audit fees, which are thousands.

Table 2
Sample Distribution by Auditor and Country

<i>Country</i>	<i>AA</i>	<i>AY</i>	<i>CL</i>	<i>DHS</i>	<i>EW</i>	<i>PMM</i>	<i>PW</i>	<i>TR</i>	<i>Total</i>
Australia (AU)	3	7	10	9	3	11	15	9	67
Ireland (IR)	0	0	4	2	3	9	12	2	32
New Zealand (NZ)	2	9	3	9	3	4	0	3	33
United Kingdom (UK)	5	15	18	32	21	37	28	14	170
United States (US)	15	10	14	13	7	18	24	7	108
Total	25	41	49	65	37	79	79	35	410

The final sample contained 410 companies. Table 1 provides descriptive statistics for the sample, and Table 2 provides a distribution of the sampled companies according to their Big Eight audit firms.

Table 1 highlights the unavoidable selection bias that exists in the sample. The use of data sources such as *Moody's International Manual*, *Who Audits the World*, and voluntary corporate disclosures in proxy statements, resulted in the sample containing only the larger companies within each country. To illustrate this issue, note that the average US firm selected for testing had mean sales of \$4.4 billion, while *Who Audits America* listed all US companies registered with the Securities and Exchange Commission and audited by a Big Eight firm in 1982 as having mean sales of \$570 million. This selection bias restricts the generalisability of the results to large corporations only and represents a limitation of the study.

Table 2 exhibits the unequal distribution of companies sampled across countries and audit firms. These distributions do not necessarily reflect the relative concentrations of the audit firms in

these countries. Therefore, generalisations from the results of this study are again limited.

The Functional Equation

Prior studies have found a non-linear association between various company-size and complexity independent variables and an audit-fees dependent variable. Therefore, as in Francis (1984) and Palmrose (1986), a natural log transformation of audit fees was used as the dependent variable in this study.

Because the focus of this study is on the usefulness of the factors determined to be significant in prior intra-country audit-fee studies in a cross-national setting (as opposed to the development of a new audit-fees model), the choice of independent variables was limited to previously established measures of company size and complexity. In particular, the following four measures of size were used: total assets (Palmrose, 1986); sales (Taffler and Ramalinggam, 1982); receivables (Firth, 1985); and net income (Firth, 1985). Each of these measures was transformed by the natural log func-

tion. Furthermore, a square root transformation of each company's number of subsidiaries was used as one measure of complexity (Francis, 1984). Additional complexity surrogates were used based on Palmrose (1986) and Elliott and Korpi (1978): two binary variables indicating whether a company was a multinational or not and whether it was predominantly a manufacturing or a service business.

An inherent problem in using financial statement data for statistical modelling purposes is the multicollinearity that exists among the various measures (Pinches, Mingo and Carruthers, 1973). As indicated in Panel A of Table 3, extensive multicollinearity exists among the data used in this study. Unfortunately, this multicollinearity makes identifying the contribution made by a single variable to the resulting model difficult. A solution to this problem that has remained popular since first suggested by Kendall (1957) is factor analysis. Taylor and Baker's (1981) audit-fee study recognised this problem and used a factor analysis that resulted in the identification of a size and complexity factor. They then selected the highest loading variable in each factor to use in their regression models.

A factor-analysis procedure was also used in this study. The results are reported in Panel B of Table 3. As expected, and consistent with Taylor and Baker (1981), a size and complexity factor resulted. However, consistent with Kendall's (1957) original recommendation, these results were used to reduce the original data in such a way that the information contained in the smaller number of variables was equal to almost all of that contained in the larger set. Specifically, the resulting factor scores for the seven independent variables were used to transform each of the variables. After this transformation, the independent variables were aggregated according to the factor groupings. This procedure resulted in two new independent variables, size and complexity, which were used as the independent variables in the following functional equation:

$$\ln(\text{Audit Fees}) = f(\text{Size, Complexity}).$$

Results

Hypothesis 1

Table 4, Panel A, shows the results of five individual regressions of the functional equation, partitioned by country. These regression results support prior studies in that the size variable is significant in each of the five countries (across Big Eight firms) as well as for the total sample. Similar results pertain to the complexity variable except for NZ. In addition, the R^2 values for the countries are high and in line with prior studies.

However, before coming to a conclusion regarding H_1 , two additional tests are needed. First, in order to ascertain the appropriateness of having collapsed the client size and complexity data across the Big Eight firms, 16 separate regressions were run for each country (see Neter, Wasserman, and Kutner, 1983, esp. p 343).¹ For each country, the regressions took the form of:

$$y = b_0 + b_1(\text{Size}) + b_2(\text{Dummy}_i) + b_3(\text{Size} \times \text{Dummy}_i)$$

and

$$y = b_0 + b_1(\text{Complexity}) + b_2(\text{Dummy}_i) + b_3(\text{Complexity} \times \text{Dummy}_i)$$

where $\text{Dummy}_i = 1$ for Big Eight firm i

$= 0$ otherwise

This pair of equations was estimated for each of the Big Eight firms.²

Panel B of Table 4 reports the t-statistic for each of the interaction terms' coefficients. Because only four of the 76 coefficients were statistically significant, the conclusion was that no individual audit firm was driving the results reported in Panel A; thus collapsing the data across firms, within countries, was viewed as appropriate.

Finally, the direct test of H_1 involves a test of equal slopes and intercepts for each possible pairing of Panel A country models (see Johnson, 1972; Simunic, 1980; and Francis, 1984). For example, it is possible that, in spite of the statistical significance of the size variable in each country model, the extent of its 'role' in explaining audit fees may differ across country models. Panel C, Table 4, reports the results of the tests of model homogeneity and indicates that H_1 cannot be rejected except for IR. Therefore, the influence of a size and complexity factor in explaining audit fees is similar among the US, the UK, NZ and AU, across the Big Eight.

Hypothesis 2

The testing of H_2 parallels the approach described for H_1 . Panel A, Table 5, presents the results of eight regressions with the data partitioned by Big Eight firm. In each model, the size and the complexity variables were again significant and all R^2 values were quite reasonable.

¹This method of analysis compares, within a country, one firm versus the other seven. Another approach would be, within each country, to analyse all possible pairs of firms. Such an analysis was not possible due to limited degrees of freedom.

²The Big Eight firms and their abbreviations are: Arthur Andersen (AA), Arthur Young (AY), Coopers & Lybrand (CL), Deloitte Haskins & Sells (DHS), Ernst & Whinney (EW), Peat Marwick Mitchell (PMM), Price Waterhouse (PW), and Touche Ross (TR).

Table 3
Correlation Coefficients and Factor Scores for the Independent Variables

Panel A:

<i>Correlation Coefficients</i>	<i>ln</i> (Assets)	<i>ln</i> (Sales)	<i>ln</i> (Receivables)	<i>ln</i> (Net Income)	<i>(Subsidiaries)^{0.5}</i>	<i>Manufacturing</i>	<i>Multinational</i>
<i>ln</i> (Assets)	—						
<i>ln</i> (Sales)	0.822**	—					
<i>ln</i> (Receivables)	0.884**	0.733**	—				
<i>ln</i> (Net Income)	0.851**	0.781**	0.727**	—			
<i>(Subsidiaries)^{0.5}</i>					—		
<i>Manufacturing</i>						—	
							—
							0.293**
							0.287**
							0.375**
							0.230**
							0.525**
							0.156**

**Significant at the 0.01 level

Panel B:

Factor Analysis¹

	<i>Factor 1</i> (Size)	<i>Factor 2</i> (Complexity)
<i>ln</i> (Assets)	0.9354	-0.2506
<i>ln</i> (Sales)	0.8916	-0.0625
<i>ln</i> (Receivables)	0.8897	-0.1704
<i>ln</i> (Net Income)	0.8527	-0.2004
<i>(Subsidiaries)^{0.5}</i>	0.3761	0.5900
<i>Manufacturing</i>	0.0142	0.7748
<i>Multinational</i>	0.3744	0.5514
<i>Eigenvalue</i>	3.74	1.38
<i>Cumulative proportion</i>	0.535	0.733

¹A principal components factor analysis was used.

Table 4
Empirical Results for Hypothesis 1
Panel A: Regression Results
 (Coefficient/[T-value])

	Australia (n = 67)	Ireland (n = 32)	New Zealand (n = 33)	UK (n = 170)	US (n = 108)
Intercept	2.03 (6.23)**	1.58 (5.28)**	2.01 (3.86)**	2.02 (10.1)**	2.73 (16.0)**
Size	0.150 (7.03)**	0.085 (3.33)**	0.189 (5.47)**	0.159 (13.4)**	0.143 (17.5)**
Complexity	0.311 (4.44)**	0.493 (4.05)**	0.116 (1.26)	0.282 (8.36)**	0.197 (7.33)**
R ²	66.6%	72.4%	56.5%	68.9%	84.0%

Panel B: T-Values for Firm Differences

	Australia		Ireland		New Zealand		UK		US	
	Size	Compl.	Size	Compl.	Size	Compl.	Size	Compl.	Size	Compl.
AA	-1.22	1.52			0.73	0.96	0.88	0.50	-0.33	0.88
AY	-0.15	-2.88**			-2.65*	0.92	1.92	0.50	0.01	0.04
CL	0.29	0.88	0.03	-2.03	-1.15	-1.10	-0.32	-0.16	0.55	0.02
DHS	-0.28	0.58	-0.58	-1.63	1.12	0.46	-1.09	0.47	-2.16*	-0.72
EW	-0.13	-0.01	0.19	0.21	2.01	-0.21	-0.82	-0.36	0.46	-0.17
PMM	0.67	-0.14	1.62	1.12	0.87	-1.10	-0.01	-1.14	1.22	-0.18
PW	-0.62	-0.22	-2.19*	-0.10			0.97	0.24	0.42	1.08
TR	0.48	-0.55	0.05	-0.63	-0.78	-1.14	-0.69	-1.09	0.32	0.50

Panel C: F-Values for Tests of Model Homogeneity

	Australia	Ireland	New Zealand	UK	US
AU	—	3.47***	0.43	0.78	1.23
IR		—	3.96***	2.73***	4.96***
NZ			—	1.01	1.31
UK				—	0.68

*Significant at the 0.05 level.

**Significant at the 0.01 level.

***Significant at the 0.001 level.

In order to determine if one of the five countries was driving the significance of the size and complexity variables as reported in Panel A, ten additional regressions were run for each of the Big Eight. The regressions were of the same form as described for Panel B, Table 4, except $i = 1$ to 5 for each of the different countries. Panel B, Table 5, identifies the t-values for the interaction terms' coefficients. No country was significant in any of the eight audit-firm models except for the US and PW combination (see Simunic, 1980 for a similar result). Overall, therefore, these results appear to justify collapsing the data across countries.

Panel C, Table 5, presents the results of the tests of homogeneity for each possible pair of Big Eight models reported in Panel A. There is no statistically significant difference among the Big Eight audit-fee models except for the pairing of PMM with CL, DHS, EW and PW. Thus, H_2 is not rejected for seven of the Big Eight.

Limitations

Several factors in this study limit the generalisability of the results. First, as noted previously, the criterion of availability of data resulted in only large corporate clients being selected for the sample. Second, only five countries were selected for testing, and these five have strong 'Western' ties. Thus they may not reflect a varied set of international audit-fee pricing practices. Finally, only seven original independent variables were selected as potential determinants of audit fees. Even though prior literature indicates some consensus on the variables chosen for this study, prior research has also identified other variables that could further explain audit fees.

Conclusions

The results of this study indicate that the pricing of audit services among five countries (US, UK,

Table 5
Empirical Results for Hypothesis 2
Panel A: Regression Results
(Coefficient/[T-Value])

	AA (n = 25)	AY (n = 41)	CL (n = 49)	DHS (n = 65)	EW (n = 37)	PMM (n = 79)	PW (n = 79)	TR (n = 35)
Intercept	2.48 (5.83)**	1.64 (3.36)**	2.51 (11.6)**	2.09 (6.78)**	1.42 (2.56)**	1.95 (9.18)**	1.98 (9.96)**	1.81 (4.86)**
Size	0.154 (6.35)**	0.151 (4.94)**	0.143 (12.4)**	0.173 (8.68)**	0.172 (6.73)**	0.153 (14.5)**	0.173 (15.2)**	0.189 (9.28)**
Complexity	0.138 (2.24)*	0.385 (3.90)**	0.233 (5.14)**	0.209 (3.91)**	0.389 (3.75)**	0.271 (5.21)**	0.231 (5.61)**	0.198 (3.06)**
R ²	72.0%	66.1%	85.4%	73.5%	67.4%	81.7%	83.8%	79.2%

Panel B: T-Values for Country Differences

	AA	AY	CL	DHS	EW	PMM	PW	TR
AU	Size -1.83	Comp. 0.75	Size 0.08	Comp. -2.01	Size -0.02	Comp. 0.46	Size -0.06	Comp. 0.21
IR	0.53	0.64	-1.13	1.05	0.20	-1.68	0.31	-1.67
NZ	0.76	-0.69	1.57	1.76	-1.04	-0.29	0.91	0.87
US	-0.07	-0.03	-0.01	0.67	-1.26	-0.12	-0.12	0.94
					1.06	0.79	-0.53	0.06

Panel C: F-Values for Tests of Homogeneity

	AA	AY	CL	DHS	EW	PMM	PW	TR
AA	—	1.02	0.88	0.65	0.81	0.73	0.75	0.75
AY	—	—	1.31	1.27	1.08	0.92	1.11	1.02
CL	—	—	—	0.33	0.42	1.62*	0.58	0.71
DHS	—	—	—	—	0.36	1.79*	0.51	0.66
EW	—	—	—	—	—	1.56*	0.66	0.68
PMM	—	—	—	—	—	—	1.46*	1.11
PW	—	—	—	—	—	—	—	0.32

*Significant at the 0.05 level.

**Significant at the 0.01 level.

NZ, AU, IR), across Big Eight, and among the Big Eight (AA, AY, CL, DHS, EW, PMM, PW, TR), across countries, are associated with measures of client size and complexity. In addition, the evidence reflects a similarity in the influence of the size and complexity variables among four of the five country audit-fee models (US, UK, NZ, AU) and among seven of the Big Eight audit-fee models (AA, AY, CL, DHS, EW, PW, TR).

Indications of homogeneous pricing models among countries generally corroborates (except for IR) the homogeneity in accounting practices and professional accounting environments reported for the same group of countries in prior studies. Indications of homogeneous pricing models among the Big Eight generally does *not* corroborate (except for PMM) the theory of product differentiation via price differentiation. At a time when (i) international auditing and accounting guidelines are being called for (Hemp, 1985; Choi and Mueller, 1984) and (ii) the Big Eight firms are striving for greater uniform audit quality among their international operations (Mackay, 1979; Belfi, 1975), based on the results presented here, it also appears that there is a great deal of uniformity in Big Eight audit fees across countries with similar accounting and auditing environments and across the firms.

Future cross-national research could expand upon these findings by replicating this study (i) cross-sectionally, using a sample of countries with dissimilar accounting and auditing environments, or (ii) longitudinally, using a sample of once dissimilar countries that became similar (e.g. pre and post joining the Common Market), or (iii) any of these approaches combined with a sample of both Big Eight and non-Big Eight auditees.

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Volume 18 Number 70 Spring 1988

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Accounting and Business Research

Volume 18 Number 71 Summer 1988

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The Role of the Budget in Medium and Large UK Companies and the Relationship with Budget Pressure and Participation*

Stephen R. Lyne

Abstract—This study examines the perceived and desired role of the budget in thirteen medium or large UK companies, where the budget was usually perceived as a forecast of future performance although in all companies there was a minority who perceived a target element. The budget was generally used as a control device by means of calculating and investigating variances. Further, pressure to meet the budget came most strongly from the individual, not senior management or accountants. In fact, greater pressure was considered beneficial and no dysfunctional consequences from budget pressure were apparent. There was only limited participation in the budget-setting process and there was a general desire for more. No systematic explanation of the different responses between companies was found but convincing company-specific explanations were discovered. Some interesting differences between US and UK practice were observed.

Within the literature of management accounting there is much speculation and theory concerning the uses of the budget and the budget-setting process, but a much smaller body of empirical evidence as to the actual role of the budget in business environments. Further, there is very little empirical research based in UK companies. This paper presents the findings of a study into the role and perception of the budget in thirteen medium or large UK companies.

The study investigated the following issues:

- (1) The role of the budget and the desired role of the budget in these companies, with particular regard to the existence of motivational aspects of the budget.
- (2) The existence of, and attitudes towards, budget pressure.
- (3) The degree of, and attitudes towards, participation in the budget-setting process.
- (4) The extent to which differences found between the companies could be explained by factors from their organisation, structure and environment.

Brief review of the literature and general propositions stated

The 'conventional wisdom', as propagated by textbooks, reveals the budget in a multipurpose role,

i.e., it is used for forecasting, planning, coordination, communication, control and motivation.¹ There is usually little consideration given to the conflicts which arise between these roles, and almost no comment about the differences which exist between theory and practice; in fact, there is little discussion of actual practice at all. The academic literature is infrequently mentioned in the texts and references to this issue are usually confined to a few classic papers of the 1960s. The general picture is rather confused and is well summarised by Scapens' comment in a review paper on management accounting: 'Unfortunately, the available evidence is very limited; there is no coherent body of literature which describes management accounting in practice...' (Scapens, 1984, p. 36).

To enable certain propositions to be advanced in Section 2, a brief review of the literature will be presented, using a schema adapted from Otley (1977), viz.:

- (i) Budgets as targets
- (ii) Budgets as forecasts
- (iii) Managerial use of budgets
- (iv) Budgets as standards for performance evaluation
- (v) Participation in budget-setting.

The propositions provide the focus for an examination of the study's results. The purpose of the

*Financial assistance from the Chartered Institute of Management Accountants is gratefully acknowledged. I am indebted to Don Egginton for numerous valuable comments and encouragement and to Martin Snell for help with the statistical tests and for writing the necessary computer programs. I express my thanks to both, and to the anonymous referees for helpful comments.

¹This list is a compilation from a review of eight popular management accounting texts. The list is sometimes condensed to planning, control and motivation. The texts consulted were: Arnold & Hope (1983), Drury (1985), Emmanuel & Otley (1985), Heitger & Matulich (1982), Horngren (1982), Killough & Leininger (1984), Moriarty & Allen (1984) and Shillinglaw (1982).

examination is to assess the extent to which evidence from the thirteen companies in the survey supports or contradicts the propositions. The generality of the propositions, which refer to UK companies, is not intended to set up general hypotheses which can be proved or disproved on the available evidence. The limited number of companies in the study, necessitated by the need for detailed evidence, and the nature of the issues, means that generalisations must inevitably be tentative. However, the study's approach, by focusing on the evidence, offers a first stage in extending our understanding of UK budgeting behaviour, and it is hoped that the propositions will provide the basis on which further research can be developed in the future.

(i) *Budgets as Targets*

The budget becomes a motivational tool when it is treated as a target or goal to be aimed for. This aspect of budgeting has received considerable comment and research interest, at least as far back as Taylor in the early part of this century (later presented in Taylor, 1947). A classic work on this subject by Stedry (1960) gave rise to controversy over its methodology and the general applicability of its results, but not over the basic proposition that performance can be affected by using the budget as a target. Further studies such as Hofstede (1968), Carol & Tosi (1973), and Tosi (1975) confirmed this proposition.

Other writers have sought to gain further insight into this motivational use of the budget by drawing on work in other social science disciplines, e.g. Cherrington & Cherrington (1973), Ronen & Livingstone (1975). Very few writers have demonstrated how the budget can be used as a target in practice.²

(ii) *Budgets as Forecasts*

Little has been written on this aspect, perhaps because forecasting and the resultant planning are obviously of vital importance to any organisation. However, in two valuable contributions, Lowe & Shaw (1968 and 1970) have demonstrated that even in this apparently simple task there are problems. Their study of bias included in forecasts and the explanations given for this shows how unhelpful is the frequently met statement that 'our budgets are purely a forecast of expected performance' with the implication that this is objective and unquestionable. The many references to budget slack from Argyris (1952) onwards (e.g. Schiff & Lewin, 1970; Onsi, 1973) indicate some of the problems in setting the budget as a good forecast, and a paper by Otley & Berry (1979) shows that even the 'simple' statistical problems of forecasting

are far from simple. The limited amount of empirical literature on the role of the budget in UK business organisations (e.g. Perrin, 1958; Dew & Gee, 1973) indicates that the primary purpose is that of a forecast. Various UK textbooks³ consulted on this matter yield a similar verdict as do some recent case studies.⁴

From (i) and (ii) above the first general proposition is drawn:

Proposition 1: The budget in UK companies is primarily intended to be a forecast of future performance rather than a motivational target.

(iii) *Managerial Use of Budgets*

Much of the traditional writing on budgets, and almost all recent contributions,⁵ stress that the budget is primarily designed as an instrument to help management in its task of controlling the organisation. In this role, meeting the budget should not exist as an objective in itself; rather, the budget is one element in the organisational control package. In fact, where meeting the budget dominates managerial behaviour, there is considerable risk of dysfunctional activity.⁶ Hofstede (1968) strongly stresses this managerial role in general; Parker (1978) demonstrates the use of the budget as a means through which management may communicate with others in the firm.

Many recent contributions stress that the way in which the budget is used will depend, in part, on the organisation's particular context. Bruns & Waterhouse (1975) demonstrate the different outcomes that budget related activities will produce in different organisational structures. The contingency theory approach which underlies much of this recent work suggests that the managerial use of budgets will be contingent upon a firm's environment, organisation structure and technology. Thus, different environments will result in budgets playing different roles.

(iv) *Budgets as Standards of Performance Evaluation*

This is the familiar use of the budget as a means of control by comparing actual performance with budgeted performance, calculating variances and seeking explanation and remedial action where necessary.

An aspect of this use of the budget which has given rise to a good deal of research is the possible

²E.g. Hofstede (1968) discusses this at some length and Stedry (1960) to a lesser degree.

³These include Edey (1959), Batty (1978a), Baggott (1973) and Wald (1984). Some recent texts, e.g. Arnold & Hope (1983) and Drury (1985), do consider the target aspect of budgets.

⁴For example, cases in Sizer & Coulthurst (1984).

⁵For example, Merchant (1981 and 1984), Covaeski and Dirmsmith (1986).

⁶Hopwood (1972) found lower performance in his 'budget conscious' firm, i.e. those where meeting the budget was the primary goal.

consequences of the performance evaluation process. Over thirty years ago, Argyris (1952) was writing on this subject and noting some of the dysfunctional consequences of undue pressure. Subsequently, this aspect has featured in a number of papers. Bruns & Waterhouse (1975) sought to explain aspects of budget related pressure in terms of the organisation structure and environment. Studies by Hopwood (1972) and Otley (1978) (reviewed by Otley, 1977, p. 18) examined the relationship between performance and evaluation, budget emphasis and perceived pressure, and demonstrated dysfunctional behaviour resulting from budget pressure. Hirst (1981), Brownell (1982) and Hirst (1983) develop and test this relationship. Schiff and Lewin (1970) considered the way budget slack was incorporated during the budget-setting process, so that the pressure to meet the budget at the performance evaluation stage could be kept at an acceptable level. Onsi (1973) and Merchant (1985) examined the relationship between the creation of budget slack and the organisation's budgeting system.

From (iii) and (iv) above four further propositions are drawn:

Proposition 2: In UK companies the major role for the budget is as a control device through the comparison and explanation of the differences between the budget and actual results.

Proposition 3a: The use of the budget as a control device is likely to put pressure on employees.

Proposition 3b: If this pressure is too great, it will be resented by employees and will result in dysfunctional behaviour.

Proposition 4: Differences in the results which arise between the companies may be explained by differences in their organisation, structure and environment.

(v) *Participation in Budget-Setting*

This is another subject where debate and conflict exist between the differing conclusions of both theoretical and empirical work. The evidence available suggests that increased participation will cause a generally more satisfied work force but that the impact of participation on performance is unclear (e.g. Kennis, 1979). Otley (1977) gives an excellent summary of this subject. Stedry (1960) suggests, on the basis of his laboratory experiment, that participation will not produce as good a performance as an 'optimal' imposed budget. Vroom (1960) and Searfoss & Monczha (1973), along with a number of more recent studies, suggest that broad rules such as those in Stedry (1960) are inappropriate and different personality types will react differently. Argyris (1952), Becker & Green (1962) and Hofstede (1968) among many have advocated greater participation in the budget process, and

Parker (1979) has reviewed the prospects for greater participation. Swieringa & Moncur (1975) have reported the results of a survey of the extent and form of participation in US companies and other studies have sought to gain a better understanding of this aspect of budgeting.⁷

From section (v) above the final proposition is drawn:

Proposition 5: The level of participation in the budget-setting process is not great and employees desire a greater degree of participation.

Research methodology

The Sample

All the manufacturing companies listed in a national trade directory in six counties in the South West of England and who met the following size criteria were contacted and asked to participate in the sample. The size criteria were: turnover greater than £10 m, and more than 500 employees. These size criteria applied to the participating unit and not to the company as a whole.

Some of these companies were approached solely by letter, others were approached using introductions from the local branch of the Chartered Institute of Management Accountants, or from personal contacts. Ninety companies were contacted, fifteen agreed to participate and, of these, thirteen companies produced the required number of duly completed questionnaires (14% of the population chosen). Details of these companies are given in Appendix 1.

The sample was examined to see what bias was observable. All the companies were asked why they had agreed to participate. From the replies to this and other questions, and from the examination of data relating to company organisation and environment, no systematic or describable bias was evident. None of the companies had had any recent contact with other researchers and their stated reasons for participating were varied;⁸ a number expressed a strong interest in how their company compared with others.

The Basic Approach

To examine the propositions stated in the preceding section, data were collected in two ways. A questionnaire was designed which directly or indirectly covered these issues. The questionnaire was given to a small group of employees from each of three distinct groups, viz., (a) Accountants (ACCT), (b) Senior Non-Financial Managers

⁷Including Foran & De Coster (1974), and Milani (1975).

⁸For example, the Finance Director of one company stated he was participating because 'our budgeting is poor and we might learn something', whilst the Chief Accountant in another stated: 'we're really quite proud of our budgeting'.

(SNFM), and (c) First-Line Managers (FLM). The constituents of the first two groups are clear but (c) needs further definition. For the purposes of this study the FLM has been defined as the 'lowest level of management where there is a direct involvement with budget data in the course of normal work'. This group usually consisted of heads of departments or cost centres.

The purpose of sampling from three distinct groups was twofold. First, in a complex business organisation, a 'firm's view' is not likely to be held by all employees, if such a view exists at all. Thus to obtain data from different groups will more clearly reflect the reality of these issues in the company. Second, these groups were chosen because they occupy different positions in the organisation and fulfil different functions. The differences in perceptions between the groups raises issues concerning the communication within and cohesion of the organisation which merit study in themselves.⁹

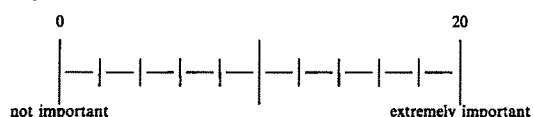
A second means of obtaining data was through a semi-structured interview with a senior financial official of the company, usually lasting 1½ or 2 hours. This had two basic aims. First, to obtain background information about the company; in particular, its structure, organisation, practices and external environment. Second, to enquire whether the firm had stated positions or policies on any of the issues under investigation.

The Questionnaire

The relevant sections of the questionnaire covered the subjects shown below; some sections and questions have been omitted here and later where they have no relevance to the issues in this paper.

- Section C—the importance of various purposes of the budget
- D—the influence of different groups in drawing up the budget
- E—the relationship between the budget, bonus schemes, promotion prospects, etc.
- G—pressure experienced to meet the budget.

The answers to many questions were given on a 'Likert-type' scale. For example, in question C the answers to each purpose were given on a scale as shown below, which was then converted to an integer score between 0 and 20, to be used in later analysis.



Six individuals were chosen from each of the three

employee groups. This size of sample was a compromise between the number needed for the statistical tests to be operable and the availability and willingness of company employees to participate. It was necessary to ensure comparability between the samples of different companies and this was accomplished by discussing the participating individual's position in the organisation with the senior financial official and by use of organisation charts or their equivalent.

The response rate of the thirteen companies in the study was as follows:

<i>Number of Questionnaires Returned</i>	<i>Number of Companies</i>
18	1
17	5
16	4
15	1
14	2
	—
	13
	—

Presentation of the findings

Before describing the findings, it is necessary to discuss the various methods of presentation which have been used. In Questions C1, C2, D1, D2, G2 and G3, the questionnaire uses a 'Likert-type' scale as this allowed the participant to answer quickly and give his or her answer over a continuous range. The results are presented in the following manner:

- (i) For each company the mean score and standard deviation (SD) have been calculated for each question. The mean and SD have also been calculated for the thirteen companies combined. This has been done for two reasons. First, as a large sample of 207 individuals, but with answers reflecting their experience in thirteen companies, the combined results must be interpreted with care. Second, this gives a benchmark against which unusual results can be seen, i.e. companies whose results are different from the general pattern.

In Figures 2, 3 and 6 on a scale of 0–20, the 'x' marks the mean score of the combined sample; the horizontal line represents the SD of the combined sample, assumed to be equal about the mean; and the arrows (↓) show any company, with its number, whose mean score is outside the range of the SD of the combined sample. The aim here is to give a general picture of the results showing the relative importance of different parts of the question (not always apparent from a ranking) and those companies whose mean answers are clearly different from the combined results.

Two further methods of analysing the results have been used but are not presented in detail.

⁹This is dealt with more fully in Lyne (1987).

Figure 1**Questions on the Purpose and Descriptions of the Budget****Question C1**

Budgets have a number of different purposes to fulfil in your company. Indicate how important you think each of the following purposes is for your company.

To forecast the future	(FORECAST)
To assist profit maximising	(IIMAX)
As a means by which management communicate to other levels in the company	(COMM)
To judge performance	(JUPERF)
As a means of calculating rewards	(REWARD)
To motivate employees to do better	(MOTIV)
To control performance by calculating and investigating variances	(CONVAR)
Any other purpose you think is important (please state below)	

Question C2

Now indicate how important you think each of these purposes *ought to be* (purposes as above).

Question C3

Which of the following best describes the budget in your company?

Average past performance	(APP)
Realistically attainable but not too loose	(RABNTL)
A target to be aimed for	(TARGET)
A forecast of expected performance	(FEP)
Performance under normal conditions	(PUNC)
Such high performance than no-one can make it	(TOOHI)

They are:

- (ii) For each company a ranking is made of the mean score of the replies to each part of the questions; the highest mean score is given the highest rank.
- (iii) The third method of presentation is an analysis of the rankings given by the *individual respondents* in each company. It should be noted, however, that equal rankings are not uncommon.¹⁰

In Sections C and D there are two similar questions. C1 and D1 ask what *does* happen, while Questions C2 and D2 ask what *ought* to happen. These two results are compared using Wilcoxon matched-pairs tests and the results are presented in Appendices 2 and 6 showing the significant differences.

For all the rankings of means presented, Kendall's Coefficient of Concordance has been calculated and in all cases the hypothesis that there is no association can be rejected at a significance level of 0.001 and thus it is concluded that there is an adequate consensus between the individuals for comment to be made regarding the company as a whole.

¹⁰For example, it is the case that in 10 companies \geq half the respondents rank item 1 first, but also \geq half the respondents rank item 2 first, for one particular question.

The propositions examined

Each of the propositions stated in Section 1 will now be examined in the light of the study's findings.

Proposition 1: The Budget as a Forecast of Future Performance

This proposition was examined principally by the questions in Section C of the questionnaire which are set out in Figure 1 below.¹¹ Question C1 asks directly what *is* the purpose of the budget while Question C2 asks the respondents what *should be* the purpose. For both questions a range of alternatives is given and the respondents are required to indicate *how important* each purpose is over the range 'not important' to 'extremely important'. Question C3 asks the respondents to select the one description of the budget, from six given, which best describes the budget in their company.

Question C1. Perceived Purposes of the Budget

Figure 2 clearly indicates the least important roles for the budget, i.e. REWARD, MOTIV and

¹¹The abbreviations put in brackets are used in the Figures, Tables and text below. The replies to the question 'any other purpose' were so few and so diverse that they have been omitted from the analysis, here and in other questions.

COMM. The scores for REWARD can be better understood when compared with Section E. Clearly, the motivational and communication use of budgets is not perceived as very important. The other four roles of the budget are considered nearly equal with their mean scores ranging from 13.11 to 13.83, i.e. the forecasting and control aspects of budgeting are more important in these companies.¹²

At the individual level the same pattern is evident.

REWARD is ranked as least important by $\geq \frac{1}{2}$ individuals in all companies and MOTIV is ranked as least or next to least important by $\geq \frac{1}{2}$ individuals in 11 companies.

FORECAST and IIMAX are frequently ranked as the most important purpose.

Question C2. Desired Purposes of the Budget

Figure 3 shows that the general pattern of desired purposes in C2 is not greatly different from the perceived purposes in C1 and a comparison is made below which notes the detailed differences.

Comparison of C1 and C2

A clear difference between the pattern of responses to C1 and C2 is that IIMAX is the most important in C2 but closely followed by CONVAR and FORECAST; thus FORECAST has moved from first to third. At the other end of the range, MOTIV has a score much closer to COMM and leaves REWARD even more clearly the least important.

There is a slightly clearer picture from the analysis of individual replies but the closeness of

the three highest ranked purposes is again evident:

FORECAST is ranked as most important by $\geq \frac{1}{2}$ individuals in 6 companies;

IIMAX is ranked as most important by $\geq \frac{1}{2}$ individuals in 6 companies;

CONVAR is ranked as most important by $\geq \frac{1}{2}$ individuals in 4 companies.

An important point to note from the comparison of Figures 2 and 3 is that for every purpose listed the 'ought to' score is higher than the actual score. In other words, the respondents considered all the purposes should be more important. This could be interpreted as an irrational response or alternatively as a desire for a general increase in the use of the budget; other evidence later supports the latter view. These generally higher scores are given by all the employee groupings, although slightly more by ACCT. The largest increase is in the emphasis that should be placed on MOTIV but this is still not sufficient to give a score higher than the next most important objective when the 13 companies are combined. Moreover, in three companies MOTIV does rank higher than COMM for C2. The Wilcoxon matched-pairs results in Appendix 2 show significant increase in the 'ought to' scores for many companies, when a 10% level is used as the cut-off point for significance:

MOTIV has a significantly higher C2 score in 12 companies;

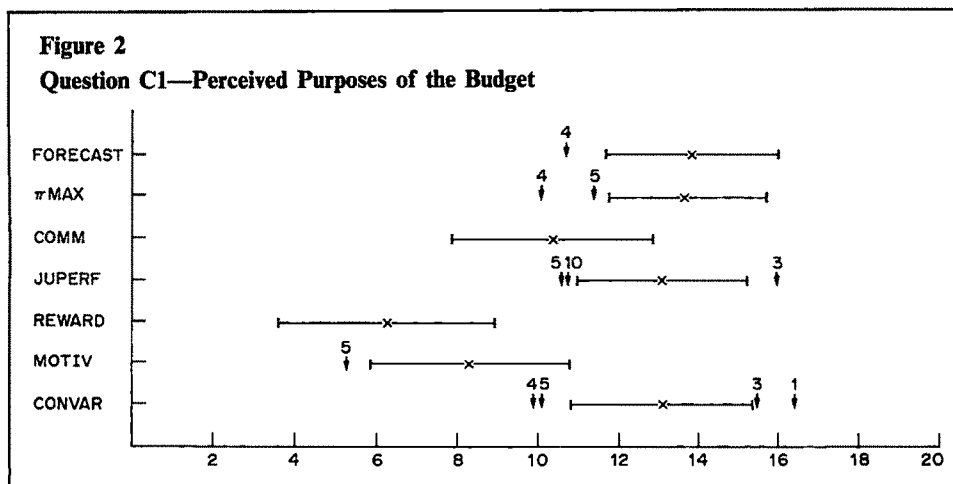
CONVAR has a significantly higher C2 score in 10 companies;

IIMAX has a significantly higher C2 score in 10 companies.

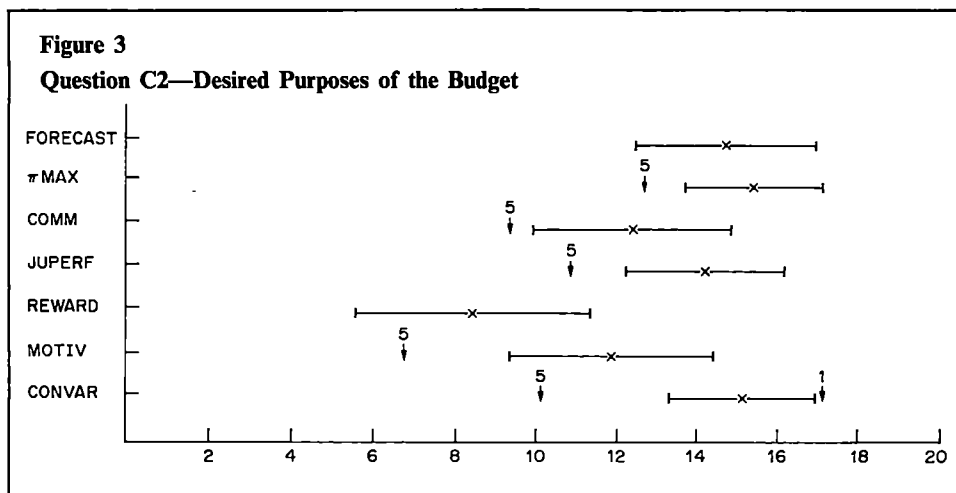
In fact, only FORECAST has fewer than 6 significantly higher scores.

Question C3. Targets and Forecasts

This simple question was designed to force a single definition rather than a ranking of purposes



¹²In Figures 2, 3 and 5 there are a number of companies who appear as recurring outliers (Company 5 on Figure 3 is the most obvious). For each of these frequent outliers there are company-specific explanatory factors.



and thus to clarify some of the ambiguity in C1. The clearest result is that more than half of all those replying considered the budget to be a forecast, and in every company but two FEP has the highest response. From Appendix 3 it is clear that this feeling is spread among the three groups almost equally. The Senior Financial Official in every company stated that their firm's budget was primarily a forecast and thus a high response to FEP was anticipated.

The responses can be rearranged into two groups, one which implies some target element in the budget and one where the budget is designed only as a forecast:

		%
pure forecast		
(1, 4 and 5)	124	60
some target		
(2, 3 and 6)	83	40
	207	100

This shows that 40% of those questioned chose a budget description that had some target element within it to best describe the budget in their company. This is perhaps surprising given the low responses to the motivational purposes in the preceding questions and so this issue was examined further.

One possible explanation for the apparent inconsistency is that one of the three groups has a different view of the purpose and description of the budget which is not evident in the mean responses to C1. For example, it could be hypothesised that the FLM perceive much more of a target element in the budget, as the budget is often set, or altered, by accountants or senior management at a level the FLM feel is difficult to achieve, whereas the ACCT and SNFM regard the budget purely as a forecast. However, an examination of the individual re-

sponses reveals that the 40% who see some target element in the budget are almost equally divided among the three groups. Thus the hypothesis is rejected.

The detailed analysis of Question C3 shows that there are clear differences in the perception of the budget *within* the different companies. Perhaps these differences represent varying perceptions of the tightness of the budget. For example, one individual may find the budget hard to achieve and consider it a target, whilst another, for whom attaining the budget is not particularly difficult, will regard it as a forecast. In Table 1, the responses to C3 have been simplified into descriptions with a target element and descriptions without, and the diversity of response is evident.

In only four companies is there a clear response and even then it is far from unanimous. In an attempt to understand this diversity, a second hypothesis was examined: that the spread of replies to Question C3 was related to the degree of difference in C1 v. C2. The rationale for the hypothesis was that the spread of C3 replies indicates confusion within the company as to the role of the budget and the greater this confusion the greater will be the difference between how the budget *is used* and how respondents think it *ought to be used*.

This was tested by calculating for each company:

$$x_j = \sum_{i=1}^n (|C1_i - C2_i|)^2$$

and

$$Y_j = \sum_{i=1}^n (C3_i - \bar{C3})^2$$

where

i = individual in company j

and

$\bar{C3}$ = mean response in company j

Table 1													
<i>Company</i>	1	2	3	4	5	6	7	8	9	10	11	12	13
Budget description with target element	10	7	9	6	2	2	9	10	6	4	7	7	4
Budget description with forecast only	8	9	8	8	14	13	7	6	11	13	10	7	10

Table 2													
<i>Company</i>	1	2	3	4	5	6	7	8	9	10	11	12	13
E5 per Appendix 4b	N	—	—	—	—	N	N	—	N	—	—	N	—
E5 with ACCT excluded	N	—	Y	—	N	—	N	Y	N	Y	Y	N	Y

and calculating the correlation between X and Y for all j . The correlation obtained was 0.377 and thus the hypothesis could not be substantiated and the cause of the diversity in responses remains unexplained.

The motivational aspects of the budget in these companies was investigated further in Section E of the questionnaire. The questions and results for Section E are presented in Appendix 4 and are summarised briefly below.

In Appendix 4b, where 'yes' and 'no' answers are given, an arbitrary rule has been adopted to categorise the replies. Where the replies to one question of one type are \geq twice the replies of the other type, the company is classified by that response (i.e. either 'yes' or 'no'). Where this is not the case, the company is not classified.

Appendix 4b shows that in one company there is financial reward for meeting the budget, in ten companies there is no reward, while in two there is no consensus as to the rewards available. These results must be treated with care as these questions are particularly sensitive to the role and position of the respondents in the organisation; in particular the ACCT are not usually subject to a budget in the way many line managers are. The results for E1 have been recomputed excluding ACCT and the result remains unchanged. Appendix 4c shows the results of combining all replies as if they were one sample (thus great care should be taken when drawing any inference from the result) and reveals that only 18.6% of respondents perceive any financial reward for meeting the budget. For SNFM this increases to just over one quarter.

The remaining results from Appendix 4b will be briefly summarised. The overall response shows a vast majority perceiving no financial penalty linked to budget performance or 'poor performance' generally or any perks resulting from their performance. On the question of financial rewards for 'good performance' generally there is a less clear picture. Two companies respond 'yes', four companies 'no' and the majority are unclear. Overall,

46.6% perceive some financial reward for good performance. The response to E5 on the importance of the link between budget performance and promotion prospects reveals five companies with a clear 'no' response and the remainder unclear. An examination of the individual responses in Appendix 4b shows that the response from ACCT is different: 13.6% of ACCT answer 'yes' while for SNFM the figure is 63.4%. If the categorisation is repeated excluding ACCT, the results are as shown in Table 2.

Thus the study's findings in relation to proposition 1 can be summarised. The basic proposition that the budget in UK companies is primarily intended to be a forecast of future performance is generally supported by the results of Questions C1–C3. In Question C1, the forecast role is perceived as most important and in C3 over half the individuals state that a forecast is the best description (60% when the replies are amalgamated). Likewise, respondents considered that the forecast role should be very important, only slightly behind the highest response.

Further, the answers to C1 and E1 indicate that the budget is not directly used to motivate and reward to any significant degree, and the general picture from Section E is that there is some financial reward for general good performance, that financial penalties and the giving of perks are not used, and that the linking of promotion to the achievement of the budget is generally found for line management and very markedly so in some companies. Thus, it can be seen that the role of the budget in motivating is slight and indirect. Discussion with company officials revealed that in most cases the motivational procedures used were based on the firm as a whole and rely on loyalty to the firm by the employees in response to the company being perceived as a good and fair employer. This was not tested in the questionnaire but the issue of motivational methods in UK companies could be an informative subject for future research.

Proposition 2. The Budget as a Control Device

This proposition was also examined primarily through the questions in Section C of the questionnaire and the findings presented in Figures 2 and 3 above support the proposition.

In Questions C1 and C2, the purpose CONVAR is given very high support. The purpose JUPERF, which has some similarity to CONVAR, is also strongly supported. Thus a combination of propositions 1 and 2 shows the budget being used as a control device through the operation of a variance analysis system where the budget is designed as a forecast. This view is further supported by discussion with the senior financial official in each company.

However, the picture is not entirely clear. The budget purpose IIMAX is given greatest importance in C2 and second in C1. This may indicate that a general business awareness is quite widespread and that the budgetary process is seen as important to these business objectives.¹³

Proposition 3a. Using the Budget as a Control Device Causes Pressure

As the basis of proposition 2 has been upheld, proposition 3 can now be examined. Section G of the questionnaire asked various questions concerning budget pressure, its consequences and individuals' reaction to it,¹⁴ and these form the basis of the investigation of propositions 3a and 3b. The questions asked are shown in Figure 4 and the responses in Appendix 5.

The results for Question G1 in Appendix 5a reveal that in 10 companies the composite answer is that there is pressure to meet the budget. In none of the companies do the answers show no pressure. At the individual level, three quarters of the replies show some pressure while one quarter feel none. When the analysis is repeated excluding ACCT, the pattern is even more pronounced. All except Company 5 give an overall picture of some budget pressure and in the sample excluding ACCT 86% of individuals replied that they experience some budget pressure. Thus, in the sample companies there is an overwhelming majority of respondents who experience pressure to meet the budget and proposition 3b can be examined.

Proposition 3b. Budget Pressure Will be Resented and Will Lead to Dysfunctional Behaviour

This proposition was not investigated by a direct question about resentment and dysfunctional behaviour. The question of resentment was examined

¹³This shows similarity with the 'profit conscious' firms in the studies by Hopwood (1972) and Otley (1978).

¹⁴There are a number of more elaborate methods of quantifying budget pressure, e.g. Bonini (1962), but these were not used as they would have significantly lengthened the questionnaire.

Figure 4

Questions on Budget Pressure

Question G1

Do you feel any pressure put on you to meet the budget?

Question G3

How much of this pressure comes from the following groups?

Top Central Management	(TCM)
Top Divisional Management	(TDM)
Accountants	(ACCT)
Immediate Superiors	(IMSUP)
Yourself	(YOUSF)

Question G4

Do you think more or less pressure to meet the budget would help in attaining the company's major objectives?

Question G5

During the last year or so has any pressure on you to meet the budget increased/remained constant/decreased?

indirectly by seeking the source of the pressure in Question G3 and dysfunctional behaviour was investigated by question G4 which asks whether more or less pressure would help in attaining the company's major objectives.

Question G3 seeks to ascertain the source of budget pressure and the response is by far the most varied in the whole study. Thus, Appendix 5b, showing mean ranks, has to be used with care. The SDs are all very large, there are many outliers, and there are problems in interpreting the replies, partly due to the different ways the question might be interpreted in different organisational structures, e.g. TDM and IMSUP may be the same for some in FLM group. However, two implications are clear from these results:

- Pressure from YOUSF is shown as the greatest; this may be interesting evidence for those who advocate that self-motivation and pride in work are important but neglected characteristics of employees. Further examination of this issue was outside the scope of this study. However, further research on this matter could be profitable; and in particular, investigation of the relationship between high self-generated pressure and motivational methods.
- Pressure from ACCT is clearly the least. This is in spite of the fact that most companies have accountants playing a major role in the preparation of the budget.

There are major differences between the three employee groups in the answers to this question

but the matter is dealt with elsewhere.¹⁵ Thus the traditional view of budget pressure emanating from accountants and senior management (e.g. the classic study by Argyris, 1952, p. 16) is not found in these companies.

Question G4 asks whether more or less pressure would help in attaining the company's primary objectives and in the light of the previous theory and comment outlined in Section 1 the results are surprising. Appendix 5C shows that in all companies more pressure is considered to be helpful and overall 86% agree with this. The differences between the employee groups is small, ranging from 93% of ACCT to 80% of SNFM.

That the great majority of the respondents consider greater pressure would be beneficial is contrary to most other findings.¹⁶ This must also be viewed in the light of the answers to Question G5 in Appendix 5d where 42.5% of respondents stated they had experienced increased budget pressure in the last year and 54% stated it had remained constant. Hofstede (1968), p. 153, found that 15% of his sample thought that standards were 'fairly loose' or 'too loose' and might consider pressure should be increased, but this represents only a minority of his respondents rather than the great majority in favour of increased pressure in this study. Further, there is no evidence of dysfunctional behaviour in the questionnaire responses¹⁷ or in discussion with company officials.

Proposition 5: Participation is Not Great and Further Participation is Desired

This proposition will be dealt with before proposition 4 as the results from proposition 5 are needed in the investigation of proposition 4.

The questions in Section D (shown in Figure 5 below) investigate how much influence the various groups in the company have in drawing up the budget. Indirectly, this gives information about the degree of participation that is perceived by employees and may indicate the degree of central control that exists.

Questions D1 and D2. Perceived and Desired Influence

The results depicted in Figure 6 give a pattern that many would have anticipated. TDM have most influence over the budget, exceeding that of TCM, and OTHP have by far the least influence. The picture from the rank data is similar. In only

Figure 5

Questions on Who Sets the Budget

Question D1

Within your company various groups will have influence when the budget is being drawn up. Indicate below how much influence each of the following groups has in your company.

- | | |
|----------------------------|--------|
| Top Central Management | (TCM) |
| Top Divisional Management | (TDM) |
| People throughout the firm | (OTHP) |
| Accountants | (ACCT) |
| Any other group | |
| (please state) | |

Question D2

Now indicate how much influence you think each group *ought to have* when the budget is being drawn up.

one company is OTHP not ranked as having least influence; 9 of 12 companies rank TDM as having the greatest influence. Similarly, at the individual level, OTHP is ranked as having least influence by $\geq \frac{1}{2}$ individuals in 9 companies and TDM is ranked as having most influence by $\geq \frac{1}{2}$ individuals in 9 companies. The responses to question D2 on the desired influence in setting the budget show no change in the ordering of the four groups although the pattern is less clear than in D1.

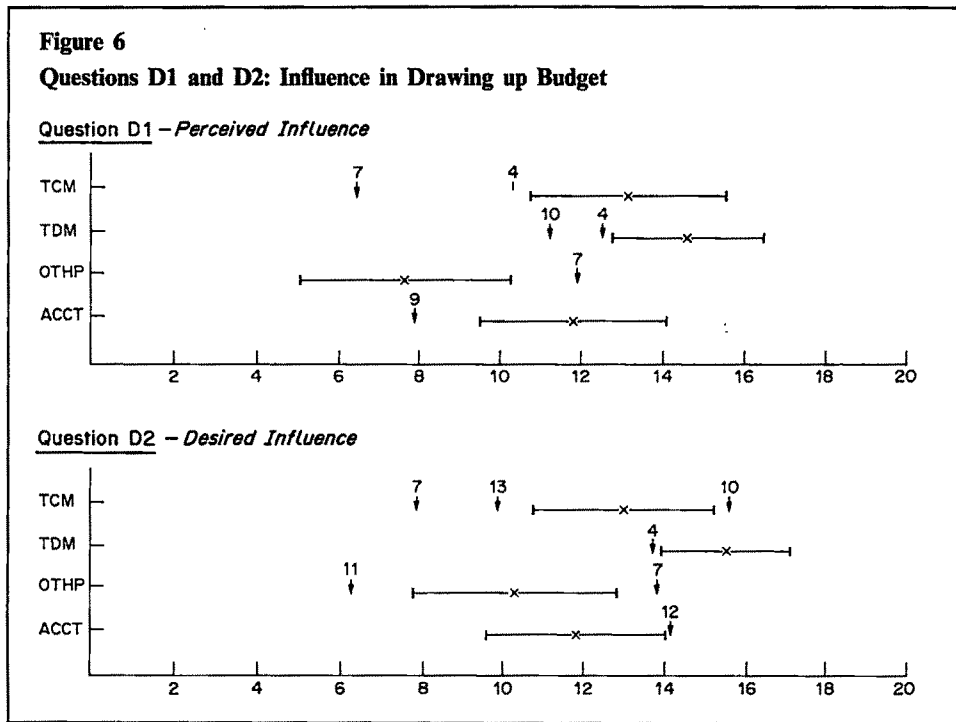
Comparison of D1 and D2

The comparison of D1 and D2 shows an increase in the desired amount of influence to be given to TDM and a smaller SD indicates general agreement on the matter. In Appendix 6, four companies have a significantly higher score in D2 than in D1 for TDM. The clearest difference occurs in the comparison of OTHP. Figure 6 shows a considerably higher score in D2 for OTHP and in Appendix 6 there are 9 companies where a significantly higher score for D2 has been recorded. This pattern is seen in all three employee groups but most strongly in ACCT. At the individual level, from 210 replies, only 21 give a D1 a score higher than D2 for OTHP. This is evidence of a general desire for greater participation in the budget-setting process. Thus the basic elements of proposition 5 are confirmed in these companies: the level of participation is not great and increased participation is desired. That ACCT are the most keen for increased participation is of particular interest. The traditional view of the accountant in the budgeting process (as typified by Argyris, 1952) depicts the budget accountant as one who believes that the work force is basically lazy and scheming and must be controlled by the imposition of a budget against which actual performance is carefully monitored. The picture revealed here is very different, in which accountants are keen to see the

¹⁵See Lyne (1987).

¹⁶For example, Hopwood (1973), pp. 21ff, Bruns & Waterhouse (1975).

¹⁷Question F3, not reported here but described in Lyne (1988), asked 'Does the budget ever hinder the improvement of performance?' In no company did a majority say 'yes'; in 10 companies a majority answered 'no', with less than one quarter of all respondents replying 'yes'.



workforce and lower line management actively participating in the budget-setting process with the budget having increased importance.

Proposition 4. Differences Between Companies May be Explained by Differences in Organisation, Structure and Environment

This proposition cannot be tested in such a rigorous fashion as to be a test for contingency theory, although the proposition is clearly drawn from this literature. The proposition is investigated in two ways: first by examining the companies who frequently appear as outliers in the foregoing sections; and second by examining the pattern of results for the 13 companies in search of explanatory factors.

In Section 4, the existence of various outliers was noted. When the most frequent outliers were examined there were always company-specific factors which explained the different responses. For example, company 5 in Figures 2 and 3 shows a lower score for many of the purposes of the budget, both actual and desired. In this company the budget does play a much reduced role as there is another effective control system in operation which is not based on the budget.

A more general explanation of the differences in results between the companies was sought by examining a number of hypotheses that might explain differences. The hypotheses were drawn from the literature reviewed earlier and from the comments received and insights gained while visiting the companies. The following hypotheses were examined by drawing up 2 × 2 contingency tables

between the relevant hypotheses and the explanatory factor and calculating the probability of such a result occurring.¹⁸

A. The degree of participation in the budget-setting process is related to the type of budget used in the company (as indicated in Question C3). Thus, the companies were classified as type 1 if their budget was viewed by the majority as a pure forecast, and as type 2 if there was a target element. Participation was classified into high and low levels depending on whether the budget originated in the accounting function or with line management.

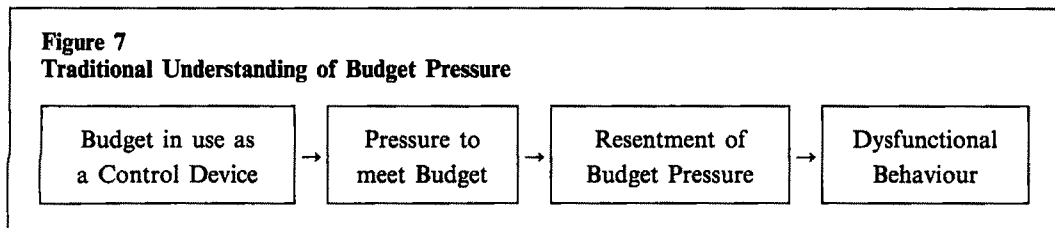
The contingency table for this relationship is:

	Participation	
	High	Low
Budget type: Target	5	0
Forecast	3	3

There are two companies who cannot be split by budget type as the responses are almost equally divided.

From this contingency table, the probability of such a result occurring can be calculated directly. The calculation indicates that the probability of this result (and any more extreme results) occurring by chance is 0.182. Whilst this is not significant in the usual sense, it may indicate that there is some relationship and in a sample of this size, where significant results at 5% or 1% levels are very rare, this cannot be ignored. This is the only relationship found that explains the diversity

¹⁸The techniques for this are reviewed by Yates (1984) and more simply explained by Bailey (1964), p. 61.



found in the responses to Question C3 and it does have intuitive appeal.

B. The differences between the actual role of the budget, as indicated in Question C1, and the desired role from Question C2 may be explained by the following factors:

1. The degree of participation in setting the budget.
2. The origin of the budget, i.e. from the accounting function or line management.
3. The degree of variance analysis in use.
4. The size of the company, by turnover and number of employees.
5. The product type in terms of the length of production cycle, i.e. adaptability.
6. The market in which the company operates; significant overseas sales or not.

The probabilities calculated from the contingency tables for each of these hypothesised relationships indicate that there is no significant relationship between these factors. With a sample as small as 13, there has to be a very high level of differentiation to obtain a statistically significant result. The hypotheses advanced earlier are probably too simple to explain the situation in complex business organisations and the data is not detailed enough to test more complex hypotheses.

C. The amount of participation by all sections of the company may be related to factors of the company's organisation and structure, such as: (i) company size; (ii) profitability; (iii) degree of divisionalisation.

D. The companies who gave the TDM the highest scores in Question D1 were those with the least participation, i.e. giving a high score to the divisional management indicates a company which has a budget set by senior line management rather than as a result of participation throughout the organisation.

E. The companies who gave ACCT the lowest scores were those where the participation was greatest; i.e. where ACCT do not have the major role in the budget-setting process the company is likely to adopt a more participative style of budget preparation.

None of the contingency tables for the hypotheses C, D and E produce statistically significant results and the comments made under hypothesis B apply here. Only for hypothesis E, where the probability of the result occurring by chance is

0.196, does the result indicate that the hypothesis may have some validity.

General comments and conclusions

In a survey of management accounting, Scapens comments that the practices observed in the United States should be compared with those of United Kingdom companies¹⁹ as there appear to be differences. There were two aspects of this present study where such differences were apparent. The first is the use of the budget as a target. There are few items in the literature which directly address the question of the purpose of the budget (for example Perrin, 1958, Dew & Gee, 1973, for the UK, and Sord & Welsh, 1957, in the US) but a difference in emphasis between the two countries is revealed.

In the UK the forecast role is found almost exclusively while in the US discussion of the typical definition 'realistically attainable but not too loose', reveals some target element. A similar difference is seen in textbooks of the two countries. The UK texts consulted²⁰ view the budget as a forecast of expected performance while the US texts contain both aspects (for example, Knight & Weinwurm, 1964 and Welsch, 1976). Welsch states: 'the objectives and goals should be capable of attainment . . . [but] must represent a real challenge to the manager and the operational unit'. A review of some recent UK case studies (Sizer & Coulthurst, 1984) revealed that the budgets in these companies were used as forecasts, without any direct target element. Thus in the literature this difference is apparent and the general view of the companies studied here is in line with the usual position in the UK. However, there is a sizeable minority of respondents (40%) who have adopted the view commonly found in the US.

The second aspect where the difference between the US and the UK may be important is the extent of and reaction to budget pressure. As was noted above, the general view from the literature of the relationships between pressure and behaviour is shown in Figure 7.

However, in this study 86% of the respondents stated that increased budget pressure would be

¹⁹Scapens (1984), p. 17, for example.

²⁰As in footnote 3.

desirable and there is no indication of dysfunctional behaviour. The normal understanding of budget pressure as in Figure 7 is derived mainly from research and writing in the US. A possible explanation for the different results found in this study derives from a difference between the two countries. The degree of budget pressure may be higher in the US and such that it is resented and produces dysfunctional behaviour, while in the UK the degree of pressure is much less, is primarily personal, and does not produce an adverse reaction. This has not been tested in the study but anecdotal evidence which compares UK companies with US subsidiaries in the UK supports this hypothesis.

The major conclusions of this study are now presented in terms of the five propositions given in Section 1.

Proposition 1. The company budget is most commonly viewed as a forecast of future performance; however, there is a sizeable minority, spread through all the companies, who perceive some target element in the budget.

Proposition 2. The use of the budget as a control device through the calculation and explanation of variances was considered one of the major purposes of the budget, along with forecasting, assisting profit maximisation and judging performance.

Proposition 3a. The pressure felt by most respondents in this study was not perceived as emanating from accountants or senior management; the greatest pressure experienced was internally generated and indicates that the major motivation was personal.

Proposition 3b. There was no indication that pressure to meet the budget caused dysfunctional behaviour; in fact, 86% of respondents considered increased pressure would be beneficial, even though 97% of respondents had experienced increased or constant pressure in the preceding year.

Proposition 4. The differences found between the companies could not be explained by systematic differences in their organisation, structure and environment. However, the particular unusual features of individual companies could usually be understood in the light of their particular circumstances. This may indicate that either:

- (a) the relationships that could provide systematic explanation of the differences between companies are more complex than this study was able to elucidate, or
- (b) the most important explanatory features are company specific and are not likely to produce systematic explanatory relationships.

Proposition 5. General participation in the setting of the budget was not a feature generally found in

these companies though, in all, there was a desire to see increased participation. This desire was most strongly expressed by accountants.

From a sample of thirteen companies it is not easy to draw general conclusions. However, on the basis of this sample, which is not unrepresentative of medium and large UK companies, these results provide a good indication of the use of the budget, the role and effects of budget pressure, and the extent and desire for participation in the budget-setting process.

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Appendix 1**Characteristics of Companies in Sample**

<i>Company</i>	<i>Employees</i>	<i>Turnover £m</i>	<i>Company Part of a Group</i>	<i>Products</i>	<i>Markets</i>	<i>Production Cycle</i>
1	2,170	>100	Yes	Chocolates	Almost all UK	Long lead on new products
2	3,300	80	Yes	Undercarriages, hydraulics, etc.	$\frac{2}{3}$ export $\frac{1}{3}$ governments	2 year lead time on new products
3	3,000	70	Yes	Avionics and communication systems	$\frac{1}{2}$ export sizeable govt. share	Long
4	11,000	500	Yes	Aircraft	Worldwide substantial govt. share	Long
5	1,550	40	Yes	Packaging	10% UK market share	Short
6	3,500	400	Yes	Oil products	UK market mainly price taker	Very high capital commitment
7	610	15	No	Sand extraction and concrete products	Mainly local	Short
8	1,100	31	Yes	Electronic components	20% export 40% government 40% UK	Varied
9	750	24	No	Ball and china clay	75% export	
10	2,000	50	Yes	Aircraft environmental systems	90% aircraft $\frac{1}{3}$ government	1 year or longer lead times
11	625	15	Yes	Textiles	40% industrial 60% general	Short
12	510	11	No	Household and industrial brush products	UK	Short
13	2,000	170	Yes	Cellophane and packaging	Market declining but share increasing	Continuous

Appendix 2**Results of Wilcoxon Matched-Pairs Test for C1 v. C2**

<i>Company</i>	<i>Actual and Desired Purposes of the Budget</i>													<i>All</i>
Forecast				10						1				0.1
II Max	5	5		1			5	5	10	1	10	10	5	0.1
Comm	5	1		10			1		10	5	1		10	0.1
JuPerf	10	5					5		10	5	10			0.1
Reward				5			10	5	10	5	5	5		0.1
Motiv	1	1	1	1	10	10	1	1	1	1	1	1		0.1
Convar		5		1		10	1	10	5	5	5	5	5	0.1

'1' = the difference between C1 and C2 is significant at 1%
 '5' = the difference between C1 and C2 is significant at 5%
 '10' = the difference between C1 and C2 is significant at 10%
 '0.1' = the difference between C1 and C2 is significant at 0.1%
 All significant results of the Wilcoxon matched-pairs test have the C2 mean score greater than the C1 mean score.

Appendix 3					
Results of Question C3 by Employee Group					
Description	<i>Descriptions of the Budget</i>				
	Total	%	ACCT	SNFM	FLM
1. APP	11	5.4	2	6	3
2. RABNTL	44	21.3	17	16	11
3. TARGET	36	17.3	10	9	17
4. FEP	107	51.6	31	38	38
5. PUNC	6	2.9	4	0	2
6. TOOHI	3	1.5	2	0	1
	<hr/> 207 <hr/>	<hr/> 100 <hr/>	<hr/> 66 <hr/>	<hr/> 69 <hr/>	<hr/> 72 <hr/>

Appendix 4**Results for Section E***Appendix 4a: Questions on Motivational Methods Questions:*

- E1 Do you receive any financial reward for achieving the budget you have been given (e.g. bonus, commission, etc)?
- E2 Do you suffer any financial penalty for not achieving the budget?
- E3 Do you receive any financial reward for 'good performance' in your job?
- E4 Do you suffer any financial penalty for 'poor performance' in your job?
- E5 Do you consider that your promotion prospects depend on your ability to achieve the budget?
- E6 Do you receive any non-financial rewards (e.g. perks of some form) for achieving the budget or 'good performance'?

Appendix 4**Results for Section E***Appendix 4b: Answers to Questions Regarding Rewards etc. Based on Budgets*

	1	2	3	4	5	6	7	8	9	10	11	12	13
E1 FIN.REW.B	N	N	N	N	N	N	N		N		N	N	Y
E2 FIN.PEN.B	N	N	N	N	N	N	N	N	N		N	N	N
E3 FR.GOOD P	Y			N	Y				N		N	N	
E4 FP.POOR P	Y	N		N	Y		N		N	N	N	N	N
E5 PROMOTION	N					N	N		N			N	
E6 PERKS FOR B	N	N	N	N	N	N	N	N	N	N	N	N	N

The answer Y (Yes) or N (No) indicates responses \geq to a ratio of 2:1 in favour of that answer.

Blank indicates the responses are not clearly in favour of either alternative.

Appendix 4					
Results for Section E					
<i>Appendix 4c: Analysis of Answers from Section E by Employee Grouping</i>					
		Total %	ACCT %	SNFM %	FLM %
E1 FIN.REW.B	Yes	18.6	12.1	26.8	16.4
	No	80.9	87.9	73.2	82.2
	No response	0.5	0	0	1.4
E2 FIN.PEN.B	Yes	10.5	3.0	16.9	11.0
	No	88.5	95.5	83.1	87.6
	No response	1.0	1.5	0	1.4
E3 FR.GOOD P	Yes	46.6	42.4	47.9	49.3
	No	52.9	56.1	52.1	50.7
	No response	0.5	1.5	0	0
E4 FP.POOR P	Yes	28.6	27.3	38.0	20.5
	No	70.9	71.2	62.0	79.5
	No response	0.5	1.5	0	0
E5 PROMOTION	Yes	40.9	13.6	63.4	43.8
	No	58.6	86.4	36.6	54.8
	No response	0.5	0	0	1.4
E6 PERKS FOR B	Yes	0.5	1.5	0	0
	No	99.5	98.5	100	100
	No response	0	0	0	0
Number of Respondents		210	66	71	73

Appendix 5														
Results from Section G														
<i>Appendix 5a: Question G1. Do You Feel Pressure to Meet the Budget?</i>														
Company	1	2	3	4	5	6	7	8	9	10	11	12	13	Total
Yes	14	15	14	8	7	11	11	14	9	15	12	8	15	153
No	4	2	3	4	8	4	5	2	7	2	4	5	1	51
Category	Y	Y	Y	Y		Y	Y	Y		Y	Y		Y	Y
To be categorised as 'Y' (Yes) those answering the question must be $\geq 2:1$ in favour of that answer														

Appendix 5																
Results from Section G																
<i>Appendix 5b: Ranking of Mean Scores for Question G3</i>																
<i>Source of Budget Pressure</i>																
Company	1	2	3	4	5	6	7	8	9	10	11	12	13	Average Rank	Ranking of Average Ranks	
TCM	2	1	1	1	3.5	2	2	2	2	3	2	4	2	2.11	2	
TDM	3	3	3	2	2	4	4	4	3	1	4	2	4	3.0	3	
ACCT	1	2	2	3	1	1	1	1	1	2	1	1	1	1.38	1	
IMSUP	5	4	5	4	3.5	3	3	3	4	4	3	3	3	3.65	4	
YOUSF	4	5	4	5	5	5	5	5	5	5	5	5	5	4.85	5	

Appendix 5**Results from Section G***Appendix 5c: Results for Question G4*

G4. Do you think more or less pressure to meet the budget would help in attaining the company's major objectives?

Company	1	2	3	4	5	6	7	8	9	10	11	12	13	Total	%
More	15	12	12	12	9	10	12	8	10	15	14	11	12	152	85.9
Less	3	5	3	0	3	1	3	3	1	1	1	1	0	25	14.1
Category ¹	M	M	M	M	M	M	M	M	M	M	M	M	M	M	

¹To be categorised as 'more', those answering the question must be $\geq 2:1$ in favour of that answer.

Appendix 5**Results from Section G***Appendix 5d: Results for Question G5*

G5. During the last year or so, has any pressure been on you to meet the budget?

Company	1	2	3	4	5	6	7	8	9	10	11	12	13	Total	%
Increased	11	9	8	2	5	3	3	9	5	8	7	3	9	82	42.5
Remained constant	6	8	8	7	10	9	13	6	7	7	8	10	6	105	54.4
Decreased	1	0	0	1	0	1	0	1	1	0	1	0	0	6	3.1
Category ²	I	C	=	C	C	C	C	I	C	I	C	I	C	C	

²The category here is simply determined as the answer with the largest response.

Appendix 6**Results of Wilcoxon Matched-Pairs Test for D1 v. D2***Who sets the Budget v. who ought to set it*

Company	1	2	3	4	5	6	7	8	9	10	11	12	13	All
TCM		1↓						10↑						
TDM		5↑			5↑		10↑				1↑			0.1↑
OTHP		5↑	10↑			1↑			5↑	1↑	1↑	1↑	5↑	0.1↑
ACCT			10↓		10↓	5↓				10↑				

1 = the difference between D1 and D2 is significant at 1%

5 = the difference between D1 and D2 is significant at 5%

10 = the difference between D1 and D2 is significant at 10%

0.1 = the difference between D1 and D2 is significant at 0.1%

↑ = the mean score for D2 is greater than the mean score for D1

↓ = the mean score for D2 is less than the mean score for D1

An Analysis of the Content of Corporate Submissions on Proposed Accounting Standards in the UK*

John B. MacArthur

Abstract—In this paper, 'content analysis' is used to investigate corporate submissions on proposed accounting standards on two levels. First, the written submissions of companies on 28 of the first 31 UK Exposure Drafts (EDs) are examined in detail for any economic or political references. A moderate level of evidence is found to support the hypothesis that some potential economic and political consequences of ED proposals are a major interest of corporate management. The second 'content analysis' endeavours to identify the relative significance to corporate management of 27 EDs by simply comparing the absolute and relative numbers both of respondents and also of lines in their 'comments'. This approach could be used to derive 'weights' for analytical models that consider the economic and political consequences of groups of ED 'comments' together. It is found that there are statistically significant high positive correlations between the results of the two content analyses. That is, EDs that in their 'comments' received the most (least) frequent references to economic and political consequences, also tended to be the most (least) significant in terms of volume of submissions. This indicates that the EDs included in the study were remarkably consistent in their overall economic and political impact on corporate commentators.

Introduction

Since 1970, the Accounting Standards Committee (ASC) (originally the Accounting Standards Steering Committee, ASSC) has been publishing proposed accounting standards in the UK called exposure drafts (EDs). Written submissions are invited from interested parties by stated deadlines on the proposals contained in each ED. These replies are officially called 'comments'. This may be seen as a political lobbying process (see Sutton, 1984). The 'comments' are considered and eventually Statements of Standard Accounting Practice (SSAPs) are issued that describe the methods of accounting that are approved by the councils of the six major UK accountancy bodies. Accounting researchers have in particular been interested in the insight that this procedure gives into the views of corporate management and others on the issues dealt with in various EDs and in the resultant accounting standards.

Hope and Gray (1982) used a sociological/political methodology to identify the power group(s) that had the most apparent political influence over the ASC in the formulation of SSAP 13 on accounting for research and devel-

opment (R & D). The authors analysed the 'comments' on both the preliminary ED 14 and the revised ED 17 on R & D. They concluded that the major changes incorporated into ED 17 and SSAP 13 principally resulted from the expressed views of the aerospace industry. Hope and Briggs (1982) considered some lessons on accounting policy making from the debate on deferred taxation. Among other things, they identified the views of commentators on both the first and second ED on accounting for deferred taxation; that is, EDs 11 and 19. Other authors have related the 'comments' of corporate management on various EDs to selected company characteristics in order to identify any possible economic consequences from the ED proposals that may have helped to determine the expressed views (e.g. Sutton, 1980 and MacArthur, 1985). This latter research follows the 'positive theory' approach of Watts and Zimmerman (1978) in the US, where such studies have been far more numerous (see Watts and Zimmerman, 1986).

This paper investigates an alternative approach to the analysis of corporate 'comments' on EDs. This methodology has been called 'content analysis' and was used to analyse topics addressed in annual reports (Bowman and Haire, 1975; Bowman, 1976, 1978, 1982 and 1984). This may consist of simply counting the number of lines or words used to address a particular subject. For example, the number of lines in the annual report of selected companies devoted to corporate social responsibility could be obtained and expressed as a percentage of the total number of lines (Bowman

*This paper is based on research done for a PhD thesis at the University of Wales. The author thanks his supervisor, Professor Roger E. V. Groves, for his comments and assistance. Thanks are also due for the comments and advice of Professor Dennis E. Clayton, Professor Mike O. Rod (deceased), and Mr Paul Weitzel, of the University of Northern Iowa, and of anonymous reviewers.

and Haire, 1975). Alternatively, coding schemes may be used to identify the emphasis given to areas of interest. Comparisons could be made of the content of the annual reports of more successful *vis-à-vis* less successful companies in order to identify common statements of the respective types of companies that may give insight into the differentiating strategies of such concerns (Bowman, 1976).

Content analysis is a very deliberate system of investigation, as succinctly stated by Bowman (1978, p. 65): 'The inquiry process relies not on casual reading but on rather explicit counting and coding of particular lines of prose, of word usage, and of disclosure'. It is a relatively straightforward procedure but it was stated that 'viewed as an unobtrusive projective test, content analysis and organization of annual reports may yield a comparative picture at a distance, a gestalt, not readily available through other methods' (Bowman, 1984, p. 62).

In the context of accounting standards, some coding of corporate or auditor ED submissions was an essential preliminary step for further statistical analyses into the economic consequences of proposals. Typically, submissions were coded 'for' or 'against' either an entire ED (e.g. Watts and Zimmerman, 1978) or specific critical parts of an ED's recommendations (Puro, 1984). In this manner, the dichotomous dependent variables were obtained for comparison with selected independent variables in probit, multiple discriminant analysis, or other models. This paper is intended to complement such statistical research by analysing the content of corporate ED 'comments', first, for evidence of economic and political consequences from ED proposals and, second, to identify the relative significance of EDs to the management of respondent companies.

There are two methodological difficulties with research studies such as this one that analyse ED submissions. First, formal submissions are only one part of the process by which companies are able to exert influence on the ASC. Other possible avenues include pressure on their auditors, informal pressure on the ASC and its officers, and failure to comply with extant standards such as SSAP 16 (current cost accounting) (ASC, 1980B). Second, the reasons claimed in formal 'comments' for opposing or supporting a proposed standard may not be the company's real motive for lobbying (see Watts and Zimmerman, 1979). Further research endeavours employing complementary methodologies, such as questionnaire studies, would help to remedy these deficiencies.

Corporate evidence of consequences from accounting standards

It has been argued that the implementation of

accounting standards could potentially result in favourable or unfavourable economic and political consequences for companies. The possibility of such consequences might provide a partial reason to explain why corporate management lobby the ASC in response to EDs.

Economic Consequences

Proposed changes to accounting numbers have the potential to affect corporate contracts that use such numbers and to change the financial relationship and cash flows of contractual parties, such as lenders, shareholders and managers. Accounting numbers are used in some contract negotiations and subsequent monitoring (e.g. in connection with borrowing limits in loan agreements). They are also used as a basis for cash and non-cash payouts (e.g. dividend payments and management compensation schemes geared to accounting numbers).

In addition to any immediate cash flow impact, changes in accounting numbers may also have potential longer-run cash flow effects, such as 'expected changes in tax policy, anticipated regulatory actions, future political costs, and additional bookkeeping expenses' (Kelly-Newton, 1980, p. 143). For example, it seems clear from the foreword to ED 6 (accounting for stocks and WIP) (ASSC, 1972A) that Sir Ronald Leach, the then Chairman of the ASSC, recognised that the implementation of the ED proposals could alter the profit numbers in the financial accounts of some companies and change their taxation liabilities, unless there was some prior agreement with the Inland Revenue. In addition, both the immediate and expected longer-term cash flow effects of changed accounting numbers should cause an immediate reaction in the share prices of quoted companies by efficient capital markets.

Political Consequences

The 'political' linkage between accounting numbers and cash flows is principally based upon implicit rather than explicit contractual relationships between a corporation and, for example, politicians, regulators, trade unions, and bureaucrats (see Holthausen and Leftwich, 1983, pp. 87-88). Of course, there are formal 'political' contracts such as are determined by corporate tax statutes (see Zimmerman, 1983). Corporate bodies, especially larger ones, are rather exposed to criticism from many quarters and may resort to such things as costly publicity campaigns and also to the adoption of accounting procedures which minimise reported profits (Watts and Zimmerman, 1978). This latter ploy may be argued to be an attempt by management to withhold from regulators, politicians and others, 'excuses' of excessive profits for criticising and even penalising prominent companies (Holthausen and Leftwich, 1983, p. 88). It

does seem that larger corporations tend to be subject to more extensive disclosure requirements (e.g., Cmnd. 6888, 1977, p. 7). They also tend voluntarily to provide better quality information, partly in order to minimise political and regulatory pressures, at least in the US (Singhvi and Desai, 1971, and Dhaliwal, 1980, p. 386); and they tend to arouse 'intense opposition' (Utton, 1982, p. 21). For example, large firms had more severe price controls than small firms under the Price Code of the 1970s (e.g. Cmnd. 5205, 1973, pp. 5 and 14).

Large oligopolistic and monopolistic companies are likely to be sensitive to high absolute and relative profits that may be considered unreasonable by the press, general public and others, and which might draw or force institutional bodies, such as the Monopolies and Mergers Commission (MMC) to investigate them. Managers employed by such companies might be expected to have an incentive to favour accounting standards that tend to depress reported profits, in order to protect their job security and future earnings prospects. Since the Fair Trading Act, 1973, the MMC investigates suppliers with a market share of at least 25% in particular products that have been referred to it by the Director General of Fair Trading or the Secretary of State for Trade and Industry (Pass and Sparkes, 1982, p. 42).

The period covered by the empirical research reported in the ensuing sections of this paper was from 1970 to 1982 inclusive; and between 1970 and 1980 in the UK there were more or less continuous controls on prices and profit margins. For example, under the Price Code, gross and net profit margins were not allowed to rise above a reference level based upon an average of two previous years' profits (see Cmnd. 5205, 1973; Cmnd. 5267, 1973; Cmnd. 5444, 1973). Clearly there was an incentive to camouflage profits by supporting conservative accounting principles at least during the 1970s.

Lower profits might be an advantage in wage negotiations with trade unions, too, especially during periods of their dominance such as the 1970s. Lower wage settlements would leave more of the corporate 'cake' to benefit management outside the bargaining unit and the residual shareholders. Maunders and Foley (1974, p. 124) pointed out that pre-tax profits are usually thought to be the best indicator of an employer's ability to pay. UK trade union negotiators have tended to prefer 'the "grossest" (trading profits)' and to add back 'discretionary (subjective) elements', such as depreciation expense (Foley and Maunders, 1977, pp. 132 and 166, respectively). Perhaps it is unlikely that such union officials would be fooled by cosmetic accounting changes, although, in a US study, union officials complained about 'accounting changes' (Palmer, 1977, p. 33).

In addition, large private sector companies may have to consider the possibility of being nation-

alised or becoming regulated like US public utilities, if they are too politically visible. Private banks in the UK were being considered in this way a few years ago. Low profit figures may also assist management to reduce these possibilities.

During the final three years of the research period (1980-1982) and into the 1980s, the controlled economic climate was steadily replaced by a more *laissez faire* environment, with the Conservative Party in government from 1979. The ruling party's open encouragement of private enterprise and the profit motive probably caused corporate management to perceive growing pressure to report *increased* earnings in order to justify larger dividends, to maintain share prices and to enable them to deter potential acquirors or to use their paper to acquire other companies.

Evidence Contained in ED 'Comments'

It is recognised that some managerial concern may not be directly mentioned in corporate submissions, or at least could be camouflaged, for a number of possible reasons. It is envisaged that the main factors leading to the omission or hiding of the true grounds for lobbying could be their public unacceptability or the anticipated adverse economic and political repercussions from such 'comments' through the effect of media publicity, Inland Revenue response, competitor or client reaction, and so on. This problem is partly alleviated by the right of companies to state that their submissions are not for public record (although at least one company's letter with such a request apparently 'slipped through the net' and was placed on the public file). However, some reasons may be deemed by management to be inappropriate even for the ASC and, in any case, they would be unavailable to outside researchers. For example, one commentator on ED 29 (accounting for leases and hire purchase contracts), stated: 'It is felt that A.S.C. is somewhat naive in expecting companies who have incurred capital expenditure "off balance sheet," which they would not have incurred if the expenditure was identified in the account, to identify themselves' (ASC, 1982A, p. 167).

The economic and political content of the corporate submissions on 28 of the first 31 EDs issued by the ASSC/ASC are considered in this section. These were published between 1970 and 1982 and are shown in Table 1 with the exception of seven EDs that did not stimulate any economic or political comments by companies; namely, ED 2 (disclosure of accounting policies), ED 4 (earnings per share), ED 9 (the accounting treatment of *grants* under the Industry Act 1972), ED 12 (the treatment of taxation under the imputation system in the accounts of companies), ED 13 (statement of source and application of funds), ED 17 (accounting for research and development), and ED 28

(accounting for Petroleum Revenue Tax). The three EDs entirely excluded from the content analysis were ED 3 (accounting for acquisitions and mergers), as it was withdrawn by the ASSC, and the two proposals dealing with current cost accounting—ED 18 and ED 24. The latter two were omitted because it was decided to concentrate on historical cost EDs, including ED 8 (accounting for the purchasing power of money) that advocated supplementary historical cost accounts adjusted by general purchasing power indices, that could have had some impact on accounting numbers included in such things as borrowing restrictions in loan contracts. Berry *et al.* (1985) discussed a survey that provided some supporting evidence that most corporate loan decisions ignore CCA accounting numbers. On the other hand, retail price inflation indexing was 'widely used domestically' in the 1970s (Editorial, 1976), and it might have seemed feasible to corporate management that eventually such index-adjusted accounting numbers advocated by ED 8 would be incorporated into loan agreement restrictions, and so on, and thus have potential economic consequences. In addition, ED 18 and ED 24 dealt with issues that were fundamental to the whole financial reporting process and elicited 336 and 75 corporate 'comments' respectively. To include them in the analysis would swamp the impact of the other EDs.

The column headings of Table 1 are a classification of the economic and political points raised in the formal 'comments' of corporate management on the 21 EDs analysed. The identification of corporate economic and political effects was aided by the economic consequences literature both in the US (e.g. Watts and Zimmerman, 1986) and also in the UK (e.g. MacArthur, 1985). In addition, other corporate references to proposals that would affect company cash flows and/or the visibility of their organisation in some way were recorded in the 'Other Economic and Political References' column of Table 1. Of course, any subjective element in the selection procedure is somewhat of a limitation of the analysis.

The numbers reported in the matrix presentation of Table 1 indicate how many companies mentioned each consequence for each of the 21 EDs. An overall column total is also shown for each consequence. In addition, an overall row total, together with a relative rank, is shown for each ED primarily to facilitate a comparative analysis in the next section that considers the relative significance of EDs. This is an elementary form of content analysis that does not measure the relative importance of each topic. Relative significance could be indicated by such measures as the degree of space devoted to each issue. The proportionate amount of space given to each topic, however, would not be a conclusive indicator of relative

importance. The aim of the Table is to give an initial overview of the corporate 'comments' before proceeding to amplify and discuss the content in more detail. In the ensuing subsections, consideration is given to a representative proportion of the 'comments' that in particular underlie the significant numbers shown alongside various EDs in Table 1.

Loan Agreements

Articles of association, debenture trust deeds and other loan instruments generally have clauses that limit the borrowing powers of a company. Frequently such restrictions include borrowing limits that are based upon a specified multiple of share capital and consolidated reserves. Sometimes interest cover restraints on borrowing are detailed too. Implementation of proposals contained in some EDs might change accounting numbers and adversely affect calculations under borrowing power clauses. Even companies without such loan agreement restrictions might find that the ED proposals would lead, for example, to an inferior debt/equity ratio. This might reduce further borrowing opportunities, assuming some degree of inefficiency in the lending market.

As identified in Table 1, a submission on ED 6 (accounting for stocks and WIP) was the earliest example of formal 'comments' expressing corporate concern over the potential adverse effect of ED proposals on borrowing restriction calculations under loan agreements. This company stated that:

...if by excluding certain overhead costs which had been included in previous W.I.P. valuations a once and for all loss results this may have the effect of substantially reducing a company's reserves. In the circumstances where borrowing powers are a function of capital and reserves, a company may find it is in a position of being outside its permitted borrowing powers and hence liable to *dire consequences* (ASSC 1972B, ref. C3, emphasis added).

ED 11 (accounting for deferred taxation) (ASSC, 1973B), ED 29 (accounting for leases and hire purchase contracts) (ASC, 1981), and ED 30 (accounting for goodwill) (ASC, 1982B), each indicated the possibility that the implementation of their respective proposals might cause companies either to be in default of loan agreement restrictions or at least to be nearer such an eventuality. However, only ED 29 and ED 30 included this problem as one of a list that specifically requested commentators to identify the perceived adverse economic consequences of their respective proposals. It is not surprising, therefore, that the 'comments' on these two EDs dominated this particular aspect (Table 1). Of the seven ED 29 lobbyists, three were concerned only about the

Table 1
Economic and Political References in Corporate ‘Comments’

[illegible]

effect of the proposals on *future* and not existing loan agreements. In addition, there were 11 other commentators not recorded in the Table who stated that ED 29 would not have a detrimental effect on their company as regards loan agreement restrictions.

Dividend Restrictions

As indicated in Table 1, there were relatively frequent references in the corporate 'comments' to the perceived effect of ED proposals on dividend cover, both in the 'profit and loss account' (PC Column) and also in terms of 'distributable reserves' (DRC Column). One corporate commentator on ED 6 (accounting for stocks and WIP) went as far as to state that the main purpose for the profit and loss account was to determine the amount available for dividends (ASSC, 1972B, ref. C39). Some companies expressed anxiety over ED proposals reducing dividend cover while others mentioned ED recommendations that would result in excessive and misleading or fluctuating dividend cover. ED disclosure proposals were also contested. An example will be given of each type of concern.

ED 30 (accounting for goodwill) (ASC, 1982B, para. 56) recommended that for all purchased goodwill a company must choose the policy of either an immediate write-off to reserves or amortisation through the profit and loss account, and one company stated that: 'If a choice is not given in the future Standard, most companies will be forced into a situation of using the amortisation method because of the uncertainty of the impact of future acquisitions on distributable reserves' (ASC, 1983A, p. 64). This was an illustration of corporate concern over insufficient distributable reserves. On the other hand, another major company was concerned that the implementation of ED 1 (accounting for associated companies) would, *inter alia*, lead to *increased* dividend cover which would be misleading to smaller shareholders (ASSC, 1970, ref. C51). One corporate commentator seemed perturbed that the implementation of ED 5 (accounting for extraordinary items and prior year adjustments) proposals would produce '*Wild fluctuations* in dividend cover and earnings per share' (ASSC, 1971, ref. C10, emphasis added).

Many commentators on ED 20 (group accounts) were concerned over the disclosure requirements of paragraph 28 (ASC, 1977A): '*Restrictions on distributions*. The extent to which there are statutory, contractual or exchange control restrictions on the distribution of the accumulated retained reserves of the group should be indicated' (emphasis in original). For example, a company complained that: 'This presents real difficulties and seems completely impractical. Overseas subsidiaries and associated companies may well find it impossible to establish what their Reserve Bank attitude would

be in such an unreal situation. The taxation implications are of course formidable and equally unreal' (ASC, 1977B, pp. 32-33).

Information Production Costs

The costs of implementing most ED proposals came under 'attack' as reflected in Table 1. Four companies directly raised this issue with the first ED (accounting for associated companies), but this understates management concern. An additional 12 companies made related statements about ED 1, such as: 'not feasible', 'practical difficulties', 'difficulty in getting information', 'great difficulties in getting information', and 'sheer impracticability'. Of course, this might be expected from lobbyists to the first ED irrespective of its content, given a natural reluctance to accept changed procedures. In connection with some of the proposals of ED 21 (accounting for foreign currency transactions), one company complained that 'additional costs would be incurred in terms of man hours required to produce information in large international groups which would appear to be of no benefit' (ASC, 1978A, p. 51). A good example of the potential significance of information production costs was a statement included in a corporate 'comment' on ED 29 (accounting for leases and HP contracts). On a page headed: 'Economic Consequences of Capitalisation', this company stated: 'We do not consider that the major motive for lessees seeking such 'avoidance-based' leases is solely a desire to improve apparent return on assets or to circumvent borrowing restrictions: rather, in our opinion, it is often driven by a desire to minimise the costs of compliance in terms of staff, data processing and timing constraints' (ASC, 1982A, p. 125).

Share Price Effects

As depicted in Table 1, seven companies mentioned in their submissions the potential effect on share prices of certain ED recommendations. In the context of ED 6 (accounting for stocks and WIP), one corporate commentator pointed out the belief that share prices were primarily affected by 'the profit earning base' and, secondarily, by 'the net asset base' (ASSC, 1972B, ref. C1). The ED 6 recommendations on stock and WIP valuations would impinge on both corporate profit and net asset numbers.

Despite the fact that the proposals of ED 8 (accounting for the purchasing power of money) were for supplementary accounts only, one company (ASSC, 1973D, ref. C1) expressed the opinion that the resultant reported profit would be much lower than the historical cost profit and would adversely affect share prices. This helped to confirm the wisdom of the decision to retain ED 8 in the research group.

Another company suggested that the ED 11 (accounting for deferred taxation) proposals would 'encourage the type of take-over bid which relies on apparently sub-normal "post tax" returns on capital employed. The ordinary investor will have difficulty in understanding that the net profit shown in the company's audited accounts may be a false measure of the actual return' (ASSC, 1973C, ref. C34), thus implying a concern that a drop in share prices would result from the implementation of the ED 11 provisions.

A commentator on ED 21 (accounting for foreign currency transactions) stated that: 'To transfer exchange reserves differences . . . into the profit and loss account will create severe distortions of funds available for distribution and retained earnings and must have a *severe* impact on earnings cover, dividend policies and *share prices*' (ASC, 1978A, p. 60, emphases added). Clearly, this suggests significant perceived economic consequences from the ED 21 proposals.

One company seemed to be concerned that the implementation of ED 22 (accounting for post balance sheet events) might delay the 'announcements of either interim or financial figures in respect of accounting periods', because: 'Any postponement of an expected announcement could have an adverse and misleading effect upon the price of a company's shares' (ASC, 1978B, p. 19).

There were two corporate 'comments' on the impact of ED 29 (accounting for leases and HP contracts) on share prices. One company expressed concern 'as to the effect on shareholders' funds of any diminution in value of investment properties which may arise if leases on land and buildings are not excluded' (ASC, 1982A, p. 24). The other company made a clear reference to perceived imperfections in the stock market and resultant economic consequences:

Though the standard is unlikely to sway the judgement of financiers who become closely involved in a financing proposal, it seems to us to be a real possibility that it might restrict access to equity capital, through the impact on the share value of the less analytical and less rational forces which influence stock markets. Such an inference can be drawn from the recent FASB survey on the effects of FAS 13 on US companies (ASC, 1982A, p. 32).

In addition to companies directly referring to share price effects, there were several corporate 'comments' that included related references to earnings per share and price/earnings ratios.

Political Visibility

Zimmerman (1983, p. 119) stated that: 'Corporate taxes are one component of political costs' and in this paper they are considered under the

general heading of 'political visibility', together with some other political consequences.

Corporation Tax Aspects

The taxation 'comments' were mainly concentrated on ED 6 (accounting for stocks and WIP) and, once again, ED 29 (accounting for leases and HP contracts). These will be considered in turn.

First, as regards ED 6, some commentators were naturally concerned with proposed changes to stock valuation methods that would result in increased paper profits and, consequently, increased corporation taxation payments. For example, one correspondent stated: 'This company does follow the practice of "direct cost only" for stocks and work in progress, therefore, when overheads are also included a large paper profit will result. This in turn will vastly increase our taxation liability in that year, although cash available will not have similarly increased' (ASSC, 1972B, ref. C10). Another company (ref. C28) was adamant that: 'In our view no theoretical concept of changing the basis would justify the payment of a large amount of additional tax', and a different corporate respondent (ref. C47) stated that: 'We would deplore paying any more tax as a result of adopting this standard'. There were several 'comments' from companies and also from practising firms of accountants, that were similar to one submitted by a major accounting firm, which stated that it was 'essential, before issuing the standard, to obtain agreement of the Inland Revenue not to tax any uplift in profit' (ref. P21).

However, the foreword to ED 6 made it clear that the ASSC 'proposed to hold consultations with the Inland Revenue to clarify the tax aspects *before* taking any steps to issue an accounting standard on the subject' (ASSC, 1972A, emphasis added), thus indicating that the ASSC had *a priori* knowledge of the potential taxation economic consequences of the ED 6 proposals. In the event, the negotiations with the Inland Revenue were 'prolonged and at times difficult' (Institute Report, 1975, p. 9) before ultimate agreement was reached, and the eventual standard, SSAP 9, was not issued until May, 1975. Evidently, the government may have become involved in the taxation dialogue, thus 'adding to the complexities of negotiation (or at least delaying finalisation)' (Professional News, 1975). This is evidence of political involvement at the highest level in the development of an accounting standard.

Included in the 28 corporate submissions on the taxation implications of ED 6, shown in Table 1, were 16 taxation 'comments' from 'special interest' companies. These comprised seven 'maturing interests' concerns that were perturbed about additional tax payments and also nine 'plantation interests' correspondents that were anxious that overseas tax might be *deferred*! For example, one

'plantation' company was concerned that any change in traditional taxation computations that resulted in lower taxation would upset local tax authorities 'in territories which are becoming increasingly nationalistic' (ASSC, 1972B, ref. PL4). This is a clear illustration of expected political costs apparently outweighing anticipated taxation savings. Furthermore, as the aforementioned company also rejected the option of a separate set of accounts for the taxation authorities, presumably the additional information production costs of doing this were deemed to be greater than the expected taxation savings, too.

Second, the most general taxation concern of the ED 29 lobbyists was that capital allowances associated with leased assets would be granted to the lessee in the place of the lessor. These 'comments' were in direct response to a question posed in ED 29 (ASC, 1981, para. 41G), and in order to put the tax lobbies into perspective, it should be stated that ten companies expressed concern over the possible change (and are included in Table 1), five companies did not envisage an unacceptable danger of this occurring, one company believed the question to be irrelevant to the choice of a leasing standard, one company expressed a preference for such an eventuality (and is also included in Table 1), and the remaining 42 companies made no comment and, presumably, were unconcerned. The viewpoint of companies that perceived the tax 'danger' of the Inland Revenue switching capital allowances from lessors to lessees was succinctly summarised by one company's statement that the 'Inability to utilize promptly capital allowances on fixed assets purchased outright is one of the main reasons why companies enter into finance leases. It follows that many companies would be inhibited from investing in productive assets should any such change be made in the tax laws granting capital allowances to lessors' (ASC, 1982A, p. 17). This is a clear example of a potential long-term adverse economic consequence from a proposed standard. In addition, the remaining commentator was concerned over the taxation implications of the hire purchase contract proposals contained in ED 29.

Prima facie, it may seem surprising that there were no company 'comments' that expressed concern over corporate taxation economic consequences from the proposals of both ED 11 and ED 19 (accounting for deferred taxation), given the emergence of deferred tax as a major political issue for the ASC in the mid-1970s. However, the proposed forms of accounting for taxation where there are timing differences between accounting and taxation recognition of profit did not affect either the *amount* or the *timing* of actual company taxation payments. As indicated in other sections of this paper, companies did communicate concern over other potential economic consequences from

the implementation of ED 11 and ED 19 proposals.

Other Political Visibility 'Comments'

Three commentators seemed to be particularly concerned about possible adverse publicity in the press and other media following the implementation of certain EDs. For example, in commenting on ED 5 (accounting for extraordinary items and prior year adjustments), one company stated: 'Even if the line "Profit before extraordinary items" were to be redesignated "Profit for the Year", there would still be confusion in the mind of the lay reader and the likelihood of creating false impressions in the financial press. I can see the headline "X Company Loss for the Year" when the cost of rationalisation had exceeded the profit before they were charged, which was itself good' (ASSC, 1971, ref. C1). Another company expressed concern over the effect of the proposals in paragraph 49 of ED 29 (accounting for leases and HP contracts) (ASC, 1981), that lessees should be 'obliged to disclose the aggregate rental commitment until the expiration date of each lease', because: 'In our opinion such disclosure on the scale that is inevitable would give rise to highly coloured press comment with potentially damaging effects out of all proportion to the true significance of the rental commitments themselves' (ASC, 1982A, p. 47). Another company in its response to ED 29 pointed out that 'In an era of serious economic recession, when companies are having to borrow vast sums of money to survive, leasing is one way of helping the situation, by not exposing that part of a company's borrowings in the "glare of full publicity" provided, of course, that there is adequate control and financial discipline' (ASC, 1982A, p. 148). Five other companies also stated their concern that the implementation of certain EDs would result in generally damaging disclosures or publicity.

ED 25 (accounting for associated companies) (ASC, 1979, para. 13) included a proposal that an investment of 'less than 20% of the equity voting rights of a company' could be considered an associated company 'if the investing group or company can clearly demonstrate, and the associate concurs, that it is in a position to exercise significant influence under the terms of this standard'. Two companies pointed out the political dangers of seeking concurrence from a foreign associate that came into this category. For example, one company (ASC, 1980A, p. 52) stated that: 'In many cases it would be politically impossible for an (foreign) associate to make a statement of this form and hence it would also be politically undesirable (and detrimental to its interests) for an investing company even to request a formal statement' (word 'foreign' in parenthesis was added). This mirrored the other company's expressed view-

point, too. Concern was also expressed over the ED 30 (accounting for goodwill) (ASC, 1982B, para. 64(c)) proposal that the directors' reasons should be disclosed for choosing the goodwill amortisation period, for the reason that: 'Such a requirement would be likely to encourage long amortisation periods because directors might be reluctant to state why they think purchased goodwill would not last longer' (ASC, 1983A, p. 75). ED 31 (accounting for acquisitions and mergers) (ASC, 1982C, para. 17(c)) proposed that one criterion for merger accounting to be valid was that 'not less than 90% of the fair value of the total consideration given for the equity share capital... should be in the form of equity capital'. One corporate respondent complained that 'If our interpretation of the standard is correct, we think that the provisions would operate unfairly against offeree companies whose shares may be considered by certain sections of investors to be unacceptable for *political*, environmental or other reasons' (ASC, 1983B, p. 21, emphasis added).

Finally, one of the 'maturing interests' lobbyists on ED 6 (accounting for stocks and WIP) expressed concern that the ED proposals would result in higher unrealised profits during times when inventories were increasing, and thus instigate trade union demands for a 'share of this profit growth' (ASSC, 1972B, ref. M2).

Other Economic and Political 'Comments'

There were 19 economic and political references that were not clearly covered by the other headings. Of the 12 'comments' received in respect of ED 6 (accounting for stock and WIP), two companies were specifically concerned that the proposed exclusion of non-manufacturing overhead from work in progress would adversely affect profit earned on long-term government contracts. Ten companies complained in general terms that the ED 6 disclosure proposals would be commercially damaging to them because of the provision of excessive information both to clients, which would prejudice negotiations, and also to competitors.

The commentator on ED 10 (accounting for Value Added Tax) was concerned that:

With regard to any retailing organisation and in particular those offering credit and periodic payment facilities, the element of indirect tax in the ultimate selling price is as much an integral part of the price as is any other constituent of the price structure. As such VAT generates additional costs to companies through:—

- (i) Costs of financing working capital
- (ii) Incidence of Bad Debts
- (iii) Commission incentives based on the ultimate selling price.

[Besides]...upsetting established trading habits, comparative figures and trading ratios... (ASSC, 1973A, ref. C3).

Three of the six corporate 'comments' on ED 14 (accounting for research and development) opposed the proposal to write off R & D expenditure immediately because it would reduce profits on government contracts calculated as a percentage of capital employed (see, also, Hope and Gray, 1982). One company stated that 'the loss of profit could be as much as 40% to 50% of the development cost, if all the company's business is for H.M.G....' (ASSC, 1975, ref. A14). Two commentators indicated that the ED 14 proposals might inhibit their investment in R & D projects, with detrimental consequences for the British economy. The remaining company was concerned that the detailed disclosure proposals of ED 14 would mainly benefit competitors.

The relative significance of EDs

It is unlikely that the proposals contained in an ED would have a uniform effect on all companies. It is also probably true that between themselves EDs on different topics do not have equal significance for companies. These phenomena could be measured by such things as the comparative speed with which individual EDs became standards or the relative number of 'comments' submitted by companies on each ED (see Hope and Briggs, 1982, pp. 84–87). In addition, the speed of implementing individual parts of EDs and SSAPs could be compared to indicate their relative acceptability to companies (see Perks and Radcliffe, manuscript not dated). Another approach would be to compare the length of corporate submissions on EDs. *Prima facie*, the EDs that received the most prolific response were the proposals with the most significant impact on the commentators.

An overall measure of the relative significance of individual EDs to corporate management could be the summation of the number of lines in their submissions to the ASSC/ASC. This was done for the 'comments' on 27 out of the first 31 EDs and is summarised, along with other descriptive information, in Table 2. As for the previous content analysis, the omitted 'comments' were those on ED 3 (accounting for acquisitions and mergers) and those on the two current cost accounting EDs (ED 18 and 24). In addition, the corporate submissions on ED 28 (accounting for petroleum revenue tax) were also excluded because of the ED's relevance to a relatively small specialised *interest* group of companies only. Where several letters of 'comments' were submitted by a company they were included together as one submission.

Table 2 provides three measures of the volume of 'comments' submitted by companies on each

Table 2
Corporate Lobbyists and Lines in Their 'Comments'

ED	(i) No. of Companies	(ii) Rank (Highest No. = 1)	(iii) No. of Lines	(iv) Rank (Highest No. = 1)	(v) Average No. Of Lines (iii)/(i)	(vi) Rank (Highest No. = 1)	(vii) 'Total References' Rank (from Table 1)
1	49	3	3,278	4	67	7	8.5
2	16	21	322	24	20	24	—
4	9	26	400	23	44	15.5	—
5	25	15	1,384	11	55	10	6
6	72	1	5,772	1	80	4	1
7	19	18	888	16	47	14	14
8	26	12.5	1,951	8	75	5	14
9	25	15	807	19	32	20	—
10	10	25	290	25	29	22	20
11	44	6.5	2,320	6	53	11	8.5
12	15	22.5	667	20	44	15.5	—
13	24	17	850	17	35	19	—
14	15	22.5	463	22	31	21	14
15	13	24	1,358	12	41	17	11
16	28	8.5	1,353	13	48	12.5	11
17	8	27	130	27	16	26	—
19	27	10.5	1,516	10	56	9	11
20	26	12.5	1,255	14	48	12.5	3
21	45	4.5	2,914	5	65	8	7
22	27	10.5	575	21	21	23	18.5
23	18	19.5	273	26	15	27	21
25	28	8.5	1,130	15	40	18	16
26	44	6.5	826	18	19	25	18.5
27	45	4.5	4,766	2	106	1	4
29	59	2	4,025	3	68	6	2
30	25	15	2,219	7	89	3	5
31	18	19.5	1,621	9	90	2	17

ED. Column (i) discloses the total number of corporate lobbyists that commented on each ED; column (ii) indicates their respective ranking. Column (iii) measures the total number of lines of 'comments' for each ED, and column (v) indicates the average number of lines per corporate letter. Columns (iv) and (vi) rank columns (iii) and (v), respectively. Column (vii) is the 'Total References' ranking listed in Table 1, and is reproduced to facilitate comparison with the rankings of the volume measures.

As might be expected, some of the ED topics that *a priori* seemed likely to be controversial received the greater volume of 'comments' in terms of numbers of corporate lobbyists, total number of lines, and average number of lines per company. Examples of these EDs include: accounting for stocks and WIP (ED 6), accounting for foreign currency transactions/transfers (EDs 21/27), accounting for leases and HP (ED 29), and accounting for associated companies (ED 1). The preamble to ED 6 (ASSC, 1972A) stated that: 'No area of accounting has produced wider differences in practice than the computation of the amount at which stocks and work in progress are stated in financial accounts'. In the week that ED 21 was published, *The Economist* (1977, p. 125) stated that: 'Next to inflation, exchange fluctuations are probably the *most important* single distorting influence in British company accounts' (emphasis added). And in the month following the issue of ED 29, *The Economist* (1981, p. 101) predicted that 'there will be well-organised opposition to a standard, on the ground that it would have adverse economic consequences'.

Again, as might be anticipated, the EDs that elicited the most volume of 'comments' also included those that received the most frequent references in the corporate submissions to the economic and political consequences of the respective proposals [see column (vii)]. This consistency underlines the significant potential impact of these ED recommendations. For example, the EDs already referred to above as being significant in terms of numbers of corporate lobbyists, total number of lines, and average number of lines per company (namely EDs 6, 21, 27, 29, and 1), were also highly ranked at first, seventh, fourth, second, and joint eighth (8.5) positions, respectively, in the case of frequent economic and political references [column (vii)]. There was, therefore, some degree of mutual support between the information or 'signals' conveyed by Tables 1 and 2.

In consequence, some of the more innocuous ED topics were at the lower end of the range as regards the numbers of 'comments' submitted by companies, total number of lines, average line content, and in respect of the numbers of economic and political references in their 'comments'. Typically, these EDs dealt with such things as accounting

policies and other items to be disclosed in the published accounts (EDs 2, 4, 22 and 23), or other similarly less controversial areas (e.g. the accounting treatment of grants under the Industry Act 1972 (ED 9), accounting for value added tax (ED 10), and the treatment of taxation under the imputation system in the accounts of companies (ED 12) (see Ashton, 1983, p. 62).

In order to determine the statistical relationships of the research findings, the Spearman rank correlation coefficients (ρ) were calculated for the four ranks shown in Table 2. This non-parametric measure of correlation avoids the bivariate normality assumption of the parametric Pearson Product-Moment correlation coefficient (r), while it has a power efficiency of 91% of the parametric counterpart (see Siegel, 1956, pp. 195-213). The six EDs without economic or political references in their 'comments' [see column (vii)], were assigned the average rank of 24.5. This is the normal procedure for rank assignment when observations are tied (in this case, with zero references) (see Siegel, 1956, p. 206). The resultant correlation coefficients were all positive high numbers and were significant at $\alpha = 0.005$ (two-tailed tests) (Table 3). This indicates a considerable degree of consistency in the 'signals' conveyed by the four measures of the significance of ED proposals to corporate management. In particular, it is noteworthy that the economic and political 'Total References' were highly correlated with the three lobbying volume measures (number of companies, number of lines, and average number of lines), thus indicating in general terms that the EDs included in the research had a significant degree of uniformity in terms of their *overall* economic and political effect on corporate correspondents, despite wide differences both in the *specific* consequences from individual EDs itemised in the body of Table 1, and also in the *total* number of commentators and lines written on individual EDs. This result may seem to be surprising given the wide range of topics covered by the EDs included in the research, but it is consistent with the notion that each ED is important (has potential benefits and/or detriments) to those companies that take the trouble to write about its contents to the ASC and thus incur lobbying costs (see Sutton, 1984).

In future research studies that consider the economic and political consequences of groups of ED 'comments' together using analytical models, it may be feasible and worthwhile to reflect the different levels of significance through the use of 'weights' to represent the size of submissions derived from content analysis. In this regard, it is necessary to note that in general the three rankings for the absolute and relative numbers were not exactly the same for the EDs recorded in Table 2, and are therefore not identical 'weights', albeit

Table 3
Correlation of Corporate Lobbying and Economic/Political Consequences
Spearman Rank Correlation
Coefficients and (P-Values)

	<i>No. of Companies</i>	<i>No. of Lines</i>	<i>Average No. of Lines</i>
No. of Lines	0.768 (0.001)		
Average No. of Lines	0.524 (0.005)	0.901 (0.001)	
Total References	0.671 (0.001)	0.836 (0.001)	0.734 (0.001)

there was a significant statistical relationship between them. For example, ED 6 is ranked first in both numbers of corporate lobbyists and also in number of lines but only fourth in terms of average number of lines.

At the extreme, an ED can be the subject of a 'large' volume of 'comments' through either: (i) a high number of commentators submitting relatively short letters, or (ii) a low number of commentators preparing relatively long submissions. The former could be an example of an ED topic of widespread interest but moderate impact and the latter could represent an ED of a more specialised nature and more restricted interest, but with a major impact on the affected companies. Of course, relatively long or complicated EDs might require lengthy and detailed letters from concerned respondents. Such differences would need to be considered before a selection was made of the appropriate 'weights' for models used to measure the economic or other consequences from ED proposals.

Summary and conclusions

In this paper, 'content analysis' was used to investigate corporate submissions on proposed accounting standards on two levels. First, the written submissions of companies on 28 of the first 31 EDs issued by the ASSC/ASC were examined in detail for any economic or political references. Many of these EDs were published prior to the time when 'economic consequences' became a topical subject in the accounting literature and so the 'comments' on these accounting proposals should not have been influenced by such published material. A moderate level of evidence was found to support the hypothesis of 'positive' accounting researchers that some potential economic and political consequences of ED proposals are a major interest of corporate management. Particular concern was identified over the impact of ED proposals on dividend cover, on information production costs, and on

corporate taxation. Some anxiety was also expressed over their effect on borrowing restrictions in existing and future borrowing agreements, on adverse publicity in the media, on undesirable information disclosures to competitors and clients, on share prices, and on the profit from government contracts.

This detailed type of 'content analysis' would be useful as a preliminary step in identifying some apparently important consequences of ED proposals that could be included in formal models that attempt to measure their statistical significance. Thus, they beneficially complement other methods of obtaining independent variables for such analytical paradigms. Of course, the degree of usefulness of such 'content analysis' depends upon the extent of the openness of correspondents. Nevertheless, ED 'comments' seem to be a valuable resource that should not be completely ignored.

The second 'content analysis' endeavoured to identify the relative significance to corporate management of 27 EDs by simply comparing the absolute and relative numbers both of respondents and also of lines in their 'comments'. It was pointed out that this could beneficially be used to derive 'weights' for analytical models that consider the economic and political consequences of groups of ED 'comments' together. Such 'strategic' research has been encouraged in the literature (Amershi *et al.*, 1982).

It was also reported that there were statistically significant high positive correlations between the results of the two content analyses. That is, EDs that in their 'comments' received the most (least) frequent references to economic and political consequences, also tended to be the most (least) significant in terms of volume of submissions measured in number of corporate respondents, number of lines, and average number of lines. The EDs included in the study were remarkably consistent in their overall economic and political impact on corporate commentators.

In conclusion, 'content analysis' of ED 'com-

ments' seems to be a useful descriptive tool in its own right as well as benefitting other forms of research inquiry, subject to two methodological weaknesses of the analysis that limit the applicability of the results. First, formal 'comments' are only one part of the process by which companies are able to try to sway the ASC. This may partly explain the low absolute number of commentators on individual EDs [see Table 2, column (i)].¹ Second, it is possible that the views expressed by companies in formal submissions may not always be the real reasons for lobbying the ASC. Further research studies that employ complementary methodologies would help to counteract these limitations.

For example, ED commentators who did not mention any economic or political consequences from ED proposals, and also random samples of non-respondents, could both be approached via questionnaires or interviews to ascertain whether in fact they do perceive any such effects. Hopefully, such instruments would be at least as successful as the parallel procedure adopted in some EDs of asking direct questions on economic consequences, which seemed to elicit more comprehensive positive and negative responses from correspondents than most other EDs that were silent on these issues. The proposed research might in fact be more profitable as it is probable that the ASC had the disadvantage that they could only ask questions on economic consequences that *a priori* seemed likely to be significant, unlike the supplementary research being suggested here that would have an empirical basis for the selection of questions to ask corporate management.

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The Evaluation of Performance in Firms of Chartered Accountants

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Abstract—In this paper, the results are reported of a survey of the performance evaluation practices of six UK offices of four firms of chartered accountants. The objective of the study was to identify the variables which seemed likely to affect the perceived performance of chartered accountants in the UK. The study was conducted in three stages. First, a model was specified which identifies perceived performance as a function of perceived effort, perceived ability and perceived luck. Second, using a modified form of Vroom's expectancy model of motivation, the determinants of effort were identified. Finally, four work value factors were empirically derived and conceptually related to each of the variables in the model of performance and effort. The results suggest that two of the work value factors (the desire for a better quality of life and the desire to avoid uncertainty) may be particularly important.

Introduction

The future prospects of professional accounting firms will in part be determined by their success in attracting, motivating and retaining those individuals who are well-suited to a career in professional accounting. Hence the factors that motivate professional accountants should be important determinants of the future success not only of individual firms but also, ultimately, for the accounting profession as a whole.

The objective of this paper is to identify the variables that are likely to affect the perceived performance of professional accountants in the United Kingdom.¹ The study involves three stages. First, a model is specified and tested which identifies perceived performance as a function of perceived effort, perceived ability and perceived luck. Second, using perceived effort, a modified version of Vroom's (1964) expectancy model of motivation is tested. Third, a set of four work values are empirically derived which are used to test the hypotheses that performance and effort are determined by the work values of employees.

Theory and hypotheses

The Performance Model

Various aspects of the systems used by accounting firms to evaluate the performance of employees have been discussed in the accounting literature (e.g. Strawser *et al.*, 1969; Watson, 1975; Jiambalvo, 1979; Wright, 1980; Jiambalvo *et al.*, 1983; and Kida, 1984). Much of this literature assumes that employee performance is a joint function of the employee's ability and the level of effort expended by the employee. Generally it is assumed that the ability of the employee is given and that the performance evaluation system is used to increase the employee's performance by rewarding high levels of effort.

In this paper, the variables for ability and effort will be based on the employee's own perceptions. While these perceptions may not be a fair measure of the truth (however measured), it is likely that they will be more relevant to the determinants of an employee's motivation than other more objective measures. A consequence of using employee perceptions is that a third variable needs to be included in the model: perceived luck (i.e. the effects of uncontrollable events, such as being assigned to especially easy tasks, supervisors or clients). In the mind of an individual employee, luck may play an important role in determining his or her performance (Rotter *et al.*, 1962). The importance attached to luck will depend upon the personality of the individual (e.g. whether one ascribes control of the environment to oneself or to outside forces—Spector, 1982). The extent of a person's belief that performance and its attendant rewards are the result of luck is likely to be an

*The authors are indebted to John Arnold and Stuart Turley for their help. This study has been supported by the Peat Marwick Research Opportunities in Auditing Program and the School of Business and the Accounting Development Fund at the University of Washington.

¹This study uses the UK results of an international research project designed to identify cross-national differences in the determinants of performance and the performance evaluation systems of professional accounting firms. Other countries included in the project are Australia, France, the Netherlands, Japan and the US. The analysis techniques used in this paper are similar to those of the US study (Pratt, 1986) but the results are different and relate exclusively to the UK.

important determinant of how much effort that person expends. The study has therefore as its first hypothesis:

- H₁: Perceived performance is a function of perceived effort, perceived ability and perceived luck.

The Expectancy Model

Notwithstanding the importance of perceived ability and perceived luck in explaining an individual's performance, the main aim of the research is to investigate the amount of effort exerted by an employee. The model used to predict the determinants of perceived effort is based upon the valence-instrumentality-expectancy (VIE) theory of Vroom (1964) as extended by Turney (1974), Ferris (1977), Jiambalvo (1979) and Ferris et al. (1980). The model is a cognitive motivation one, designed to specify choice determinants, and is based upon the belief that individuals consider both the likelihood that certain outcomes will result from certain behaviours and the attractiveness of those outcomes.

The VIE model used in this study hypothesises that work-related effort in a firm of chartered accountants is a function of four factors:

(i) *Expectancy*—the probabilistic belief of an employee that putting a certain amount of effort into a work activity will lead to the employee being judged as performing to a particular level of quality. Hence high levels of effort should be expended in those work activities where the employee expects that high levels of effort will lead to high performance evaluations.

(ii) *Instrumentality*—the employee's perception of the probability that a high performance evaluation will result in a particular outcome (usually some reward).

(iii) *Valence* (or reward value)—the employee's perception of the value to be placed on a particular reward or outcome. An employee is expected to exert high levels of effort to achieve high performance evaluations if the evaluations are perceived to produce outcomes that are highly valued by the employee. Instrumentality and Valence are therefore usually multiplicatively combined in the VIE model to reflect in one variable both the expected outcomes and the values placed on those outcomes.

(iv) *Intrinsic activity value*—the employee's perception of the 'enjoyment' to be obtained by performing well on a particular evaluation dimension, i.e. an individual will direct a high level of effort toward an evaluation dimension if the activities associated with that dimension are rewarding in themselves.

Therefore, the study has as its second hypothesis:

- H₂: Perceived effort is a function of Expectancy, Instrumentality multiplied by Valence, and Intrinsic Activity Value.

Employee Work Value Model

In this paper, the term 'value' is used to denote an attribute of an individual that is characterised by a broad tendency to prefer a certain state of affairs over another. This is a simplified version of the definition of Rokeach (1972) that values are: 'enduring beliefs that a specific mode of conduct or end-state of existence is personally and socially preferable to alternative modes of conduct or end-states of existence'. (p. 159–160). The term 'work value' is used to denote the specific values that an employee attaches to the outcomes that are associated with work, e.g. high pay, respect from fellow employees, promotion, feelings of security and feelings of accomplishment. These types of work values have been studied by a number of researchers, including: Albrecht *et al.* (1980), Aranya *et al.* (1981), Amernic (1983) and Adler and Aranya (1984). However, these authors have not attempted to link work values directly with performance and this link forms the third element of this study.

It is apparent that the definition of work values given above fits fairly well with the notions of Valence and Intrinsic Activity Value used in the expectancy model. Valence represents the values placed by an individual on outcomes relating to the employing organisation, and Intrinsic Activity Value describes the enjoyment value felt by an individual when undertaking specific activities related to professional accounting. If work values are directly related to Valence and Intrinsic Activity Value, then, if H₂ is also true, it follows that work values will influence effort. Finally, if H₁ is also true, then work values will influence performance.

Therefore, the study has four further hypotheses:

- H₃: Valence × Instrumentality is a function of work values
 H₄: Intrinsic Activity Value is a function of work values
 H₅: Effort is a function of work values
 H₆: Performance is a function of work values

Questionnaire survey

The hypotheses were tested by distributing questionnaires to firms of chartered accountants of various sizes in Birmingham, Derby, Liverpool, London and Manchester. In each case, the questionnaires were distributed within the office to a random sample of managers and qualified seniors. To ensure anonymity, the respondents were instructed not to identify themselves and to mail completed forms directly to the authors using the stamped addressed envelopes provided. Of the 504

Table 1
Demographic Profile

Firm		Total number	Rank			Sex		Average age (yr.)	Average time spent			
City	Size		Staff	Senior	Manager	M	F		Audit	Tax	Consul.	General
Birmingham	Large	37	2	18	17	31	6	33.6	52%	15%	6%	27%
Derby	Small	6	—	2	4	6	—	42.0	27%	19%	16%	38%
Liverpool	Large	16	—	8	8	13	3	29.9	42%	15%	6%	37%
London	Large	100	—	41	59	79	21	30.0	45%	17%	6%	32%
Manchester	Large	41	—	23	18	34	7	31.1	38%	20%	8%	34%
Manchester	Medium	20	—	11	9	19	1	30.4	48%	6%	15%	31%
Total or Average		220	2	103	115	182	38	31.1	45%	17%	7%	31%

questionnaires distributed, 220 were returned giving a response rate of 44%. A demographic profile of the respondents is given in Table 1.

The questionnaire was 15 pages long and contained 125 items and, so as to check that the order of the questions was not influencing the results, two versions of the questionnaire were distributed. In version 1, the individual work value measures preceded the performance and performance evaluation system measures, while in version 2 this order was reversed. It was expected that any fatigue or order effect would be revealed by different responses in the two versions. Chi-squared tests comparing the responses to each item revealed no significant differences.

Three items were also included towards the end of the questionnaire asking the respondent to evaluate the questionnaire. The mean responses were: relevance (2.13), clarity (2.19) and interest (2.60) (using a five point scale, from 1 = very relevant, clear and interesting to 5 = very irrelevant, unclear and uninteresting). In general, therefore, most respondents found the questionnaire relevant, clear and faintly interesting, although one respondent took a violent dislike to the whole project.

Testing the H_1 hypothesis

Four measures of perceived performance were used:

- Performance level*—how high has your performance level been at work?
- Performance effectiveness*—how effectively have you helped your firm to achieve its goals?
- Performance evaluation*—compared to other firm members in your position, how high have been your overall performance evaluations?
- Promotion*—if this were your goal, how likely is it that you will continue to be promoted in your firm?

Three measures of perceived effort were used:

- General effort*—how much effort do you spend on work related activities in general?
- Extra effort*—how much time beyond that required to do minimum but acceptable work do you voluntarily spend on work-related activities?
- Aggregate effort*—this measure is the sum of the responses to a series of seven questions asking the respondent to indicate the effort expended on technical knowledge, new business, engagement planning, professional image, communications, client relations and training and supervision.

Two measures of perceived ability were used:

- Ability match*—how closely do your individual abilities and preferences match those required to perform well at work?
- Aggregate ability*—this measure is the sum of the responses to a series of seven questions asking the respondent to indicate the level of ability he or she has in the areas of technical knowledge, generating new business, planning engagements, maintaining a professional image, communications, client relations and training and supervision.

One measure of perceived luck was used—*Aggregate luck*: this measure is the sum of the responses to a series of three questions asking the respondent to assess how lucky he or she is at being assigned to especially easy tasks, supervisors and clients.

Before testing H_1 , the relationships between the chosen measures were examined to indicate the magnitude of the multicollinearity between them. For the four measures of perceived performance the correlation coefficients ranged from 0.445 to 0.667 indicating substantial multicollinearity. The performance level measure had the greatest correlation coefficients (0.508 to 0.667) and so, for clarity's sake, only this measure's results are tabu-

Table 2
Pearson Correlation Coefficients for the Determinants of Performance

	1	2	3	4	5	6
1. General effort	X	0.599	0.428	0.269	0.356	0.162
2. Extra effort		X	0.379	0.261	0.352	0.167
3. Aggregate effort			X	0.402	0.732	0.203
4. Ability match				X	0.381	0.217
5. Aggregate ability					X	0.217
6. Aggregate luck						X

(All correlation coefficients are significant at the 1% level)

lated. The correlation coefficients of the six determinants of performance are shown in Table 2.

The correlation coefficients between measures of effort, ability and luck are, with one exception, not very high, indicating that multicollinearity does not appear to be a problem. The exception is the correlation between aggregate effort and aggregate ability (0.732) and so care is needed when interpreting the results of any model containing these two measures as independent variables. The correlation coefficients between the three effort measures vary between 0.379 and 0.599 and the correlation between the two ability measures is 0.381. As each of these measures captures some unique aspect of the variable, all are reported.

Having established that each measure contains unique information, a series of analysis of covariance (ANCOVA) models were designed to test H_1 (i.e. perceived performance is a function of perceived effort, perceived ability and perceived luck). The four perceived performance measures represent the dependent variables, and the various combinations of the measures of effort, ability and luck represent the independent variables. This gave rise to 24 ($4 \times 3 \times 2 \times 1$) separate ANCOVA models. As noted earlier, only the performance level measure of performance is reported for ease of exposition, but the results of the other three performance measures were very similar. The results of the

ANCOVA test of performance level are shown in Table 3.

The percentage of explained variation (R-squared) is significant for all 24 models (in this and all following models, significance is measured at the two-tailed 10% level) and ranges from 0.24 to 0.49. Across the 24 models, the measures of perceived effort are significant on 13 occasions, the measures of perceived ability on 24 occasions and overall luck is significant on seven occasions. A comparison of these results with Table 3 indicates that performance level is the only measure of performance that fully supports the hypothesis that performance is a function of effort, ability and luck. The other performance measures of performance effectiveness, performance evaluation and probability of promotion are in all cases seen to be a function of ability, intermittently of effort and hardly at all of luck.

Six other variables are added to allow for confounding that might arise because perceived performance may be related to variables other than those hypothesised. As a result we included the employee's rank (staff, senior or manager), type of work (audit, tax, consultancy or general), size of office, city, sex and age. No interactions were hypothesised and so the effects of all interactions were suppressed. The additional factors were processed both concurrently with the original vari-

Table 3
ANCOVA Tests of the H_1 Hypothesis
Sign of Beta coefficient (level of significance)

Effort			Ability		Overall	R
General	Extra	Aggregate	Match	Aggregate	luck	squared
+(0.000)	—	—	+(0.000)	—	+(0.016)	0.30
—	+(0.001)	—	+(0.000)	—	+(0.057)	0.28
—	—	+(0.000)	+(0.000)	—	+(0.000)	0.35
+(0.004)	—	—	—	+(0.000)	+(0.026)	0.49
—	+(0.077)	—	—	+(0.000)	+(0.061)	0.48
—	—	NS*	—	+(0.000)	+(0.037)	0.48

*NS = Not significant at 10%.

Note: None of the added variables shown in Table 4 produced any significant effects when performance was measured by performance level.

Table 4
Effect of Added Variables on the ANCOVA Tests of Performance as a
Function of Effort, Ability and Luck

	<i>Sign of Beta coefficient (level of significance)</i>		
	<i>Performance Effectiveness</i>	<i>Performance Evaluation</i>	<i>Probability of Promotion</i>
Employee Rank	+(0.06)	+(0.0002)	NS
Type of Work	NS	NS	+(2 times)
Size of Office	+(3 times)	NS	NS
City	(2 times)	NS	NS
Sex	+(0.078)	NS	NS
Age	NS	-(0.011)	-(0.000)

Notes:

1. The significance level in brackets is the *highest* level of significance in each of the different ANCOVA tests (i.e. ability match with the three measures of effort, and aggregate ability with the three measures of effort).
2. (2 times) and (3 times) means that respectively two and three of the six tests produced results significant at a 10% level.
3. NS means no test produced a significant result at a 10% level.

ables and also after the effects of the original variables were removed. Little difference was found between these two approaches. No significant effects were found for any of the additional variables when performance was measured by performance level and so none are reported in Table 3. However, the added variables produced some significant effects for the other three performance measures and these results are shown in Table 4.

Employee rank is significant for all six models using both the performance effectiveness and performance evaluation measures of performance. The higher the rank of the respondents, the greater was the perception that they helped the firm achieve its goals (performance effectiveness) and the greater was their perception that they achieved a higher performance evaluation relative to other members (performance evaluation). The type of work, the size of the office and the city in which it was located seem to have little effect on perceived performance. The sex of the respondent was significant for all six models of performance effectiveness. On average, male respondents perceived that they were more effective in helping their firm achieve its goals. This may be because a much greater proportion (90.4%) of managers were male (73.3% of seniors being male). The age of the respondent had a very significant effect on perceived performance evaluation and perceived promotion possibilities. In general, the younger members of staff thought that they had had higher overall performance evaluations relative to other firm members. The younger members also thought that they had greater prospects of promotion than did older members.

Testing the H_2 hypothesis

The dependent variable of effort was measured using the three measures of effort used to test H_1 (i.e. general effort, extra effort and aggregate effort). The measures of the independent variables were produced as follows:

- (i) *Expectancy*—this measure combined two responses from the questionnaire. The relative weight assigned to effort in determining actual performance (W) was combined with the respondent's perception of the extent to which actual performance is captured in the performance evaluation (A). This combination took the following form:

$$\text{Expectancy} = W - 20A$$

(the response to A being multiplied by 20 to put it on the same scale as the response to W).

- (ii) *Instrumentality*—this measure derives from the answers to eight questions which asked the respondent to assess the link between a high performance evaluation and: accomplishment, promotion, increased respect, higher pay, challenging assignments, work-related pressure, greater freedom and work-related responsibilities.
- (iii) *Valence*—this measure derives from the answers to eight questions which asked the respondent to state the value that he or she attaches to the eight outcomes listed above in the instrumentality measure.
- (iv) *Instrumentality multiplied by Valence*—this measure was produced for each respondent and is the sum of the products of each of the

Table 5.
ANCOVA Tests of the H₂ Hypothesis
Sign of Beta coefficient (level of significance)

	<i>General Effort</i>	<i>Extra Effort</i>	<i>Aggregate Effort</i>
Expectancy	NS	NS	+(0.082)
Instrumentality } × Valence }	+(0.002)	(0.000)	+(0.000)
Intrinsic Activity Value	NS	NS	+(0.001)
<i>Additional variables</i>			
Employee Rank	NS	NS	NS
Type of Work	NS	NS	(0.026)
Size of Office	NS	NS	NS
City	NS	NS	NS
Sex	NS	NS	NS
Age	-(0.043)	-(0.056)	-(0.036)
<i>R-squared</i>	0.14	0.13	0.26

eight Instrumentality items multiplied by the corresponding Valence item.

- (v) *Inherent Activity Value*—one measure was used: this was the answer to the question: 'How satisfied are you with the specific activities which make up your work?'.

Correlation coefficients were calculated to show the extent to which the hypothesised independent variables are related. The correlation coefficients range from 0.046 to 0.166 indicating that multicollinearity does not appear to be a significant problem.

Table 5 contains the results of the three ANCOVA models designed to test H₂. The same additional factors used in the tests of H₁ were included in the model for each of the three measures of perceived effort.

The explained variance (R-squared) is significant for all three measures and ranges from 0.14 to 0.26. The beta coefficients for Expectancy and Intrinsic Activity Value are significant in explaining variance for only the Aggregate Effort measure. However, the beta coefficients for Instrumentality × Valence explain the variance of all three effort measures. The additional variables are generally not significant except for Type of Work which explains significant variance in the Aggregate Effort measure and Age which explains significant variance in all three effort measures: younger employees expending greater effort.

In general, the results provide some support for the Expectancy model posited. The main result seems to be that UK audit staff relate effort to the link between a high performance and rewards and the value placed on those rewards (Instrumentality × Valence). Aggregate effort also appears to be associated with tasks which are intrinsically enjoyable.

The explained variance is low but generally in line with the results of previous tests of the expectancy model in professional accounting settings (e.g. Ferris, 1977 and Jiambalvo, 1979). The low nature of R-squared could indicate that there are other variables which still require identification. Alternatively it could be the inevitable result of the relatively coarse nature of the questionnaire responses, where information content is lost in the generalisation of the answers.

Testing the H₃ to H₆ hypotheses

Our measure of the work values of professional accountants is based on Hofstede (1980) and consists of the first 31 questions of his questionnaire. Hofstede performed a combination of factor and cluster analyses on the responses to these items and found that the 40-nation sample formed 'cultural clusters' on the basis of four work value dimensions. He termed these dimensions: Power Distance, Uncertainty Avoidance, Individualism and Masculinity.

To identify a set of independent work value dimensions for our sample of professional accountants, we factor analysed the responses to the 31 items using a varimax rotation method (SPSSx, 1986). This procedure gave rise to four orthogonal factors with eigenvalues greater than one, explaining 36.5% of the variance. Each of the four factors and their component items with factor loadings greater than 0.40 are listed in Table 6. We have subjectively named each of the four factors by attempting to find a description that captures the concept shared by the factor's constituent items. The four factor names are: (i) sense of achievement, (ii) freedom from anxiety, (iii) autonomy and (iv) civility. These factors do not correspond closely to those of Hofstede which is not surprising

Table 6
Work Value Factors

<i>Factor</i>		
<i>Variable</i>	<i>Loading</i>	
<i>Factor 1: Sense of achievement</i>		
M4	0.698	Having an opportunity for advancement to higher level positions
M3	0.673	Having an opportunity for high earnings
I10	0.665	Making a real contribution to an organisation's success
I9	0.647	Working in a prestigious, successful organisation
I8	0.572	Having an element of variety and adventure at work
P1	0.558	Being consulted by one's superior in his or her decisions
I5	0.548	Having challenging tasks which provide a sense of accomplishment
I6	0.510	Having considerable freedom to adopt one's own approach to work
I2	0.479	Having good physical working conditions
M6	0.416	Having a good working relationship with one's direct superior
<i>Factor 2: Freedom from anxiety</i>		
U1	0.731	Having little tension and stress at work
U2	0.664	Working in a well-defined situation where the requirements are clear
M1	0.627	Having security of employment
I1	0.571	Having sufficient time left for personal and family life
I2	0.431	Having good physical working conditions
<i>Factor 3: Autonomy</i>		
U4	0.598	Expected length of future employment in the firm
U3	0.590	Belief that a firm's rule should be broken when the employee thinks that it is in the firm's best interest.
P+	0.497	Lack of belief that the main reason for having a hierarchical structure is that one knows who has authority over one.
I+	0.494	Belief that decisions made by individuals are usually of higher quality than decisions made by groups
I7	0.491	Belief that serving one's country is unimportant
<i>Factor 4: Civility</i>		
P-	0.553	Belief that it is desirable to question management authority
M7	0.504	Having an opportunity to help other people
P2	0.445	Having a supervisor who consults with subordinates and who makes decisions after considering their advice
M-	0.444	Belief that good personal relationships at work are more important than a high income

Note: the variable labels relate to the four factors of Hofstede (M = masculinity, I = individualism, P = power distance and U = uncertainty avoidance)

given the international nature of Hofstede's sample and its differing employment characteristics (Hofstede surveyed primarily staff employees in a large manufacturing firm). The operational measure of each of the four work value factors consists of summing across responses to those items with factor loadings equal to or in excess of 0.40. In this computation, each response is weighted by its factor loading.

Tables 7 to 9 contain the specific hypothesis tests. ANCOVA models are used to test the effect of the four employee work values (Sense of Achievement, Freedom from Anxiety, Autonomy and Civility) on: Instrumentality \times Valence (Table 7) Intrinsic Activity Value (Table 7), Effort (Table 8) and Performance (Table 9). As in the earlier models we have also included added variables in the tests.

In Table 7, it can be seen that the four work value factors explain a significant, reasonably substantial amount of the variance of Instru-

mentality \times Valence (0.43) and a significant but relatively small amount of Intrinsic Activity Value (0.10). The significant explanatory variables for Instrumentality \times Valence are the two work values, Sense of Achievement and Freedom from Anxiety, and the two added variables of Employee Rank and Sex of respondent (higher ranking, male accountants perceive higher Instrumentality \times Valence). The significant variables for Intrinsic Activity Value are the work value, Civility and the added variable, Sex of respondent. Male accountants who value Civility perceive greater levels of Intrinsic Activity Value.

In Table 8, there is moderate support for the H₅ hypothesis that Effort is a function of work values. The R-squared values for the three measures of Effort (General, Extra and Aggregate) range from 0.22 to 0.29. All three measures of Effort are significantly influenced by the two work value factors, Sense of Achievement and Freedom from Anxiety. Age is also significant in explaining Gen-

Table 7
ANCOVA Tests of the Hypotheses H₃ and H₄
Sign of Beta coefficient (level of significance)

	<i>Instrumentality × Valence</i>	<i>Intrinsic Activity Value</i>
<i>Work Value Factors</i>		
Sense of Achievement	+(0.000)	NS
Freedom from Anxiety	+(0.000)	NS
Autonomy	NS	NS
Civility	NS	(0.007)
<i>Added Variables</i>		
Employee Rank	+(0.068)	NS
Type of Work	NS	NS
Size of Office	NS	NS
City	NS	NS
Sex	+(0.051)	+(0.081)
Age	NS	NS
<i>R-squared</i>	0.43	0.10

Table 8
ANCOVA Tests of the Hypothesis H₅
Sign of Beta coefficient (level of significance)

	<i>General Effort</i>	<i>Extra Effort</i>	<i>Aggregate Effort</i>
<i>Work Value Factors</i>			
Sense of Achievement	+(0.000)	+(0.000)	+(0.000)
Freedom from Anxiety	+(0.000)	+(0.000)	+(0.000)
Autonomy	NS	NS	NS
Civility	NS	NS	NS
<i>Added Variables</i>			
Employee Rank	NS	NS	NS
Type of Work	NS	NS	NS
Size of Office	NS	NS	NS
City	NS	NS	(0.040)
Sex	NS	NS	(0.016)
Age	-(0.051)	-(0.056)	NS
<i>R-squared</i>	0.24	0.22	0.29

Table 9
ANCOVA Tests for the Hypothesis H₆
Sign of Beta coefficient (level of significance)

	<i>Performance Level</i>	<i>Performance Effectiveness</i>	<i>Performance Evaluation</i>	<i>Probability of Promotion</i>
<i>Work Value Factors</i>				
Sense of Achievement	+(0.021)	+(0.005)	+(0.099)	+(0.040)
Freedom from Anxiety	+(0.001)	+(0.001)	+(0.018)	+(0.020)
Autonomy	NS	NS	NS	NS
Civility	+(0.076)	+(0.095)	+(0.001)	NS
<i>Added Variables</i>				
Employee Rank	NS	+(0.016)	+(0.001)	NS
Type of Work	NS	NS	NS	+(0.092)
Size of Office	NS	NS	+(0.039)	+(0.042)
City	NS	NS	NS	NS
Sex	+(0.032)	NS	+(0.023)	NS
Age	NS	NS	-(0.012)	-(0.000)
<i>R-squared</i>	0.19	0.22	0.27	0.32

Table 10
ANCOVA Tests of the Hypotheses that Expectancy, Ability or Luck are Determined
by Work Values and Added Variables

Sign of Beta coefficient (level of significance)

	Sign of Beta coefficient (level of significance)			
<i>Work Value Factors</i>	<i>Expectancy</i>	<i>Ability Match</i>	<i>Aggregate Ability</i>	<i>Aggregate Luck</i>
Sense of Achievement	NS	+(0.000)	+(0.000)	+(0.002)
Freedom from Anxiety	NS	+(0.003)	+(0.000)	NS
Autonomy	NS	NS	+(0.073)	NS
Civility	NS	+(0.004)	NS	+(0.000)
<i>Added Variables</i>				
Employee Rank	NS	NS	NS	NS
Type of Work	NS	NS	NS	NS
Size of Office	NS	NS	NS	NS
City	NS	NS	NS	NS
Sex	NS	+(0.038)	NS	NS
Age	NS	NS	NS	(0.019)
<i>R-squared</i>	NS	0.21	0.29	0.13

eral Effort and Extra Effort, with older accountants expending less effort than younger ones (the level of significance for Age and Aggregate Effort was 0.103, just outside the 10% significance limit). The city and sex of the respondent were also significant for aggregate effort.

Table 9 shows the ANCOVA tests of the H_0 hypothesis that performance is a function of work values. There is moderate to strong support for the hypothesis with R-squared values ranging from 0.19 to 0.31 for the four measures of performance (performance level, performance effectiveness, performance evaluation and probability of promotion). The two work value factors, sense of Achievement and Freedom from Anxiety, are significant for all four measures of performance. The work value factor, Civility, is significant for the first three of the performance measures. The added variables provide sporadic significance with no clear trend.

The two work value factors of Sense of Achievement and Freedom from Anxiety are the most significant in explaining the components of the conventional VIE model. Perhaps this is not entirely surprising given the fairly close relationship between these two work value factors and traditional micro-economic utility concepts based upon wealth maximisation and risk aversion. In contrast, Sense of Achievement and Freedom from Anxiety are not significant in explaining the variance of Intrinsic Activity Value. This result would have been difficult to predict, since *a priori* one might have expected Sense of Achievement to be part of the enjoyment of work captured by the Intrinsic Activity Value. Instead it is the Civility work factor that is significant. Perhaps this result helps define the enjoyment that accountants get out of their work. Possibly, the relationships with his or her colleagues might be the primary deter-

minant of the non-rewarded aspects of an accountant's work.

As a final examination of the beliefs of UK professional accountants, a test was run to see if perceptions of Expectancy, Ability and Luck were a function of employee work values. None of the theory outlined in the paper would indicate any relationship and so the test is a speculative one. The results are shown in Table 10, where the most obvious result is that Expectancy is not related to any of the work value factors or added variables. This is not particularly surprising since Expectancy is designed to represent an objective assessment by an individual of the link between effort and high performance evaluations, rather than a measure of the individual's values or preferences.

Summary and conclusions

The objective of this study was to identify those variables which are likely to affect the performance of professional accountants in the United Kingdom. The study was conducted in three stages.

In the first stage, perceived performance was hypothesised to be a function of perceived effort, perceived ability and perceived luck. The results support this hypothesis. The perceived level of performance of respondents was significantly determined by all three factors. However, for other measures of performance the support was less strong. Respondents' perceptions of their effectiveness in helping their firm achieve its goals, their performance evaluations relative to other employees and their probabilities of promotion were all significantly determined by their perceptions of their ability, occasionally by their perceptions of their effort and hardly at all by perceived luck.



In determining perceived performance, the impact of factors other than effort, ability and luck was analysed. Respondents' effectiveness in helping a firm achieve its goals and their relative performance evaluations were found to be associated with their rank within the firm. The sex of respondents appeared to be related to the respondents' perceptions of their effectiveness in helping a firm achieve its goals, males perceiving themselves to be more effective (this may be because a much greater proportion of managers were male). Age also seemed to be important, with older respondents feeling that their relative performance evaluations and probabilities of promotion were lower.

In the second stage of the study, the determinants of work effort were tested using a modified form of Vroom's expectancy model. Only one of the three effort measures, aggregate effort (measuring effort in a variety of activities) produced strong support for the model. All three elements (Expectancy, Instrumentality multiplied by Valence and Intrinsic Activity Value) produced significant results. The two other effort measures, representing general effort and extra effort, appeared to be significantly determined by only Instrumentality multiplied by Valence. Age was also important with older respondents exerting less effort.

In the third stage, it was hypothesised that work values are determinants of Instrumentality multiplied by Valence and of the Intrinsic Activity Value and hence that, as a result of the expectancy and performance relationships, employee work values are also determinants of effort and performance. Employee work values were constructed by a factor analysis of the components of work value suggested by Hofstede. Four factors were identified which were entitled: Sense of Achievement, Freedom from Anxiety, Autonomy and Civility. The first two factors (Sense of Achievement and Freedom from Anxiety) were important determinants of Instrumentality multiplied by Valence, Effort and Performance, thus providing strong support for the hypothesis. Intrinsic Activity Value in contrast was a function of only one work value, Civility. These results suggest that professional accountants who value a sense of achievement and freedom from anxiety perceive that they exert more effort and produce above average performance. They also attach higher values to the outcomes associated with good performance evaluations. The enjoyment produced by working successfully as a professional accountant seems to be largely related to the improvement that results in personal relations at work.

The implications of the results of this study are that professional accountants are motivated by work values which are consistent with the concepts underlying economic models of individual decision-

making. The work value factor of Sense of Achievement is consistent with the economic concept of wealth maximisation in its widest sense, when non-monetary elements of wealth are considered, such as status, job satisfaction etc. The second factor of Freedom from Anxiety is closely paralleled by the economic concept of risk aversion. The results of this study thus provide qualified support for those economic models of the behaviour of professional accountants which are based upon the assumptions of wealth maximisation and risk aversion.

The implications for firms of professional accountants is that performance may be improved by careful design of their performance evaluation and reward systems. Performance evaluation systems which provide a well-defined and clearly visible link between performance and its subsequent evaluation and reward should be successful in motivating staff to greater levels of effort. The rewards which employees value are those that produce a sense of achievement. This is not only in terms of monetary reward but also in terms of an individual's feelings of self-esteem and general job satisfaction. Employees also value freedom from anxiety, and so rewards which help reduce feelings of stress and job insecurity should also be good motivational devices.

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Financial Accountability & Management

Spring 1988

Editor: John Perrin

Vol. 4 No. 1

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Alternative Realities and Price Parity Translation

Dennis H. Patz

Introduction

Two purposes are pursued in this paper, to a large extent simultaneously. The first is to re-examine the validity of Price Parity Translation Theory (Patz, 1977a) in the light of counter-arguments posed by Clarke (1978), and of the analytical and empirical findings of two subsequent and seemingly neglected papers (Beaver and Wolfson, 1982 and Oxelheim, 1983). The second and larger purpose is to illustrate *in situ* major types of logical fallacy which subtly plague efforts of accounting theory construction and problem resolution generally. Here the Clarke (1978) paper is doubly unique. On the one hand, it constitutes the only extensive and detailed effort to date to question the internal and external validity of the Price Parity Translation Theory (PPTT), and to argue the exclusion of price parity index-based translation from the choice set of alternative translation methods. On the other hand, it is also especially unusual in terms of bringing together in one place so many examples of generic logical fallacies which, in a typically more piecemeal fashion, have impacted widely and detrimentally upon communication and progress on accounting policy issues.

Translation reality

The foreign currency translation issue is first and foremost a policy choice dilemma within an essentially given environmental setting.¹ Viewed as such, the issue exhibits a most perplexing history.² In terms of US professional pronouncements, first on the scene was the Current/Non-Current Method, followed in turn by the Monetary/Non-Monetary Method and the Temporal Method. Finally came the Current Rate Method which, by a process of elimination, was about the only resource/exchange

rate combination left to adopt and try to rationalise.

Whether history will repeat itself remains to be seen. However, the correlation between material changes in the foreign exchange market and other economic conditions, and dissatisfaction with prevailing practice, has been quite high. Thus, dissatisfaction in practice with the Current Rate Method may just be deferred until the next significant alteration in the currency market setting or in the financial policy or structure of foreign operations. Even at the exposure draft stage of SFAS 52, approximately one third of the some 450 comments to the FASB presented negative positions. Indeed one argument posed at that time may account for the history of methods changes generally: 'it would seem that there are some very persuasive reasons for adopting the "son of FAS 8"—if for no other reason than to get rid of the bastard father' (Lafferty, 1981, p. 2).

There is of course a noteworthy commonality across the over five decades of attempts to find a satisfactory solution to the translation problem. They all rely upon exchange rates for effecting translation, notwithstanding a general lack of explicit analytical attention to *why* this should be the case. That is, under what conditions does the use of exchange rates make sense? Do these conditions exist? Or is it that all previous attempts to solve the translation problem have been flawed 'for the simple reason that all utilise exchange rates and there is no justification for reliance on exchange rates other than for assets which are to be converted imminently' (AAA, 1973, p. 152)?

Analytical reality

A major step at the analytical level was made by Beaver and Wolfson (B-W) (1982). Assuming perfect and complete markets, B-W attempt to 'identify a set of sufficient conditions under which the various methods possess properties claimed by their advocates'. More specifically, historical cost and comprehensive market value accounting are examined with respect to use of current and historical exchange rates, in terms of two desirable

¹As the FASB puts it (SFAS 52, p. 1651), 'the Board did not consider a change in the primary financial statement model to be a reasonable alternative for this project on foreign currency translation'.

²For a detailed history of the professional statements and studies involved, encompassing both the US and the UK since 1931, see Nobes (1985).

properties which B-W define and ground in the translation literature: 'symmetry' and 'economic interpretability'. Of note is that even within the highly idealised context of their analysis, only current rates applied to current values is found to possess both properties. The present Current Rate Method, when applied to historical cost accounts, is found to generate measures which are neither symmetrical nor economically interpretable.

However, of more direct interest is the analytic relevance of price (purchasing power) parity:

In order to interpret the disclosures under the various methods of translation, it is necessary to make an assumption about the economic forces that induce changes in the exchange rates. The perspective we adopt is that exchange rates are driven solely by differential rates of inflation among the respective countries (p. 528).

Unfortunately, the next logical step of allowing for certain market imperfections and incompleteness potentially involves an enormous increase in the complexity of the economic setting (p. 540).

B-W find that, as in PPTT, if you seek to deal with post-translation results as information that might be interpretable in economic terms, the assumption of exchange rate/price level covariance is necessary. Indeed, the empirical validity of the exchange rate/price level covariance assumption is one of seemingly only two possible justifications for reliance on exchange rates (other than for assets which are to be converted imminently). Yet B-W, noting the available empirical evidence, also observe that 'with the introduction of certain market imperfections, purchasing power parity, which we have relied upon extensively . . . , may no longer be expected to hold'. The only other justification for using exchange rates would seem to have to rest on their nature as commodity prices, rather than upon their properties as expressions of relative purchasing power.

That is, as prices, exchange rates might be analytically seen to have useful information content regarding future actions in the foreign exchange market. Used in conjunction with conventional pre-translation accounting measures, they might be considered directly relevant to estimating the foreign firm's ability to command and remit the currency of the parent in the future, with their use capable of resulting in economically interpretable measures of the (gain/loss) impact of the foreign exchange market environment on firm values and operating results. Yet to sustain this view, there must be shown to exist a relationship, generalisable across all plausible micro- and macro-economic translation settings, between the information content of conventional pre-translation accounting values and the information content of exchange rates as conversion prices, one

which would imply consistent and economically interpretable results when the two are integrated through translation and consolidation.

As above, B-W acknowledge the enormous complexity of the relevant economic setting, and Clarke (1978) rightly recognises that exchange rates do not relate to conventional accounting measures in any immediately direct and obvious manner. The best that can be said is that those who implicitly propose that exchange rate (ER) translation of conventional accounting numbers can consistently 'produce an exchange gain or loss that is compatible with the expected economic effects of a rate change', and accordingly that reliable expectations of economic effects can be formulated, have yet to establish the straightforward 'relation between rate changes and economic effects' required (FASB, 1975, Sec. 170; see also FASB, 1974, App. D).

Empirical reality

Experience with the translation issue merely suggests that something may be fundamentally wrong, and that the faulty element may be the use of exchange rates. The Beaver and Wolfson findings merely suggest that price parity is analytically relevant, and that it may not be possible to obtain consistently meaningful translation results using exchange rates. Whether PP translation will in fact produce better results in realistic settings is an empirical question, and one recent paper appears especially rich in this regard (Oxelheim, 1983).

First, Oxelheim focuses upon comparative evaluation of different methods, including PP translation, and stresses medium- and long-term distributional effects associated with monetary items. The fact that monetary items are involved is important because Purchasing Power Parity, as an explanatory theory of exchange rate behaviour, is principally related to non-monetary assets, whereas the 'Fisher International Effect' may be seen as 'the equivalent of the Purchasing Power Parity Theory on the financial market' (Oxelheim, p. 268). Thus *a priori* expectations of relative superiority for PP translation of monetary items would be less than for non-monetary items. Moreover, by dealing with monetary items the paper incorporates the interaction effects of translation gains and losses and interest costs, which are separately reported items under conventional methods and are, each alone, potentially misleading. That the medium- and long-term is stressed is important since reporting on separate *going-concern* foreign entities is what translation principally deals with, and temporal distribution effects are important since it is *periodic* reporting, even quarterly reporting, for such entities which is involved.

Second, alternative methods are evaluated in terms of *information* (as opposed to purely measurement) criteria regarding capital costs for both internal and external decision purposes. Third, the study examines five currencies of industrially important countries (Sweden, USA, Germany, Switzerland and Japan) for a contemporary period (1974–1982). Here empirical evidence is provided regarding *both* the general explanatory power of PPP Theory over the medium-term (PPP Theory is generally accepted as holding reasonably well over the long-term) *and* the comparative performance of PP translation. Finally, the paper employs PP indices obtained by way of the cheapest and simplest alternative among those considered by Patz (1981).

Oxelheim's findings are encouraging in the extreme with respect to PP translation. As to the explanatory power of the PPP Theory (of exchange rates), it was found to have 'worked well for all currencies studied', but with the ER series exhibiting considerable periodic 'noise'. Regarding alternative translation methods, 'the variation in capital cost in the profit and loss account from one period to another is considerably smaller' when PP translation rather than ER translation is employed. Indeed, the variation found in measured per annum capital costs using closing exchange rates, which all but one conventional method would employ on long-term debt, is striking. For example, for Swedish debt in US dollars, expressed as percentages of original amount borrowed, the series of annual costs observed was -3.4, 14.9, 2.6, 20.5, -0.1, 4.6, 13.4, 33.4. It is noted further that 'when accounts are prepared quarterly, the variations are even greater'. Finally, based on empirical measures explicitly linked to information criteria, Oxelheim concludes that PP translation 'should be used in external reporting as well as internal reporting'.

Enter Nirvana

The foregoing sections serve to characterise basic elements of the 'image of the subject matter' of translation which underlies the PPTT; and both the B-W and Oxelheim papers tend to impart, in a rigorous and independent fashion, additional internal and external validity to the theory. There remains, nevertheless, the Clarke (1978) paper which presents numerous counter-arguments. The next two sections consider these, firstly as they relate to the validity of the PPTT, secondly as they exemplify paradigms of accounting policy choice and accounting measurement, and generic logical fallacies which continue to plague accounting inquiry. Here, in the interests of parsimony, two

further papers will be heavily relied upon: Demsetz (1969) on the assessment of alternative institutional arrangements, and Abdel-Magid (1979) on measurement in accounting.

The PPTT is about the actual problems that real-world translation continues to pose and the policy choice between real alternative translation/consolidation information systems. One is hard put to express the overall difference between the Patz and Clarke approaches to this issue more concisely than does Demsetz (pp. 1–2):

The view which now pervades much public policy economics implicitly presents the relevant choice as between an ideal norm and an existing 'imperfect' institutional arrangement. The *Nirvana* approach differs considerably from a *comparative institution* approach in which the relevant choice is between alternative institutional arrangements. In practice, those who adopt the Nirvana viewpoint seek to discover discrepancies between the ideal and the real and, if discrepancies are found, they deduce the real is inefficient. Users of the comparative institutional approach attempt to assess which alternative real institutional arrangement seems best able to cope with the economic problem; practitioners of this approach may use an ideal norm to provide standards from which divergencies are assessed for all practical alternatives of interest and select as efficient that alternative which seems most likely to minimise the divergence.

The Nirvana approach is much more susceptible than is the comparative institutional approach to committing three logical fallacies—the *grass is always greener fallacy*, the *fallacy of the free lunch*, and the *people could be different fallacy*.

Patz (1977a) is essentially an example, albeit incomplete (see also Patz 1975, 1977b, 1978 and 1981), of a comparative institution approach in terms of various evaluative criteria. Clarke (1978) in turn is a most extreme example of the Nirvana approach, encompassing the above three Demsetz fallacies and more. Specifically, Clarke's ideal norm is 'complete technical propriety', his accounting Nirvana 'continuously contemporary accounting' (COCOA) and his translation/consolidation Nirvana is COCOA/ER translation.

The Grass is Always Greener Fallacy

The crux of this fallacy is that the superiority of one institutional arrangement cannot be ascertained solely by examining another arrangement. This means that the question of whether the PP solution can be improved upon by the substitution of the COCOA/ER solution could *never* be answered solely by examining the PPTT's claims

regarding three particular evaluative criteria.³ Yet Clarke maintains from the outset the opposite, notwithstanding that it is unlikely that the three evaluative criteria he selects for incomplete scrutiny alone constitute the set of necessary and sufficient conditions for optimal translation/consolidation. Indeed, even all the criteria applied by Patz to date with respect to the PPTT may still not approximate this set.⁴

However, it remains that Clarke conducts no comparative analysis, juxtaposing another (in particular COCOA/ER) translation/consolidation system with the PP approach (e.g. HC/PP, RC/PP, COCOA/PP). Instead, as shown later, with two of the evaluative criteria he erroneously denies the basis for their existence and with the third, he redefines the concept of 'neutrality' to purposelessness. Thus he bypasses demonstrating the superiority of his COCOA/ER arrangement in terms of these criteria, yet does not demonstrate superiority in terms of any other alternative set of information criteria. Rather, he simply becomes enmeshed in the Grass is Always Greener Fallacy.

Nirvana, being a religious term, is doubly apropos as it also conveys the religious ferocity with which Clarke and a few others seemingly hold to the belief that accounting, and now even translation, is impossible without COCOA. Indeed, as a member of the Nirvana School, Clarke runs true to form throughout:

Given the Nirvana view of the problem, a deduced discrepancy between the ideal and the real is sufficient to call forth perfection by incantation, that is, by committing the grass is greener fallacy. This usually is accomplished by invoking an unexamined alternative (Demsetz, p. 3).

The invoked, yet unexamined, alternative is COCOA/ER translation. However, the perfection of coupling COCOA with exchange rates to constitute an alternative translation system is most certainly called forth by incantation. That is, in some unspecified ways COCOA becomes the perfect valuation basis for accounting, notwithstanding an extensive history of assessments of imperfection; exchange rates somehow become the perfect trans-

lation medium, notwithstanding an extensive history of assessments of imperfection in ER-based translation; and together they provide the path to translation information Nirvana.

Of course, a major argument offered by Chambers (1966) for COCOA is that it and only it satisfies the requirements of formal or 'classical' measurement theory, and Clarke merely extends this argument to translation. Yet it is now broadly recognised that 'that narrow view of measurement should not be the criterion that determines whether quantification in accounting qualifies as measurement' (Abdel-Magid, 1979, p. 347). Clarke ignores both the existence of modern measurement (or scaling) theory and its applicability to pragmatic and complex phenomena such as that to which accounting relates. Rather, with Clarke one is confined to analysis 'on the basis of the disputed and restrictive view of fundamental measurement that was adopted in physics', and to the notion that 'measurement is the process of supplying a physical interpretation for mathematics' (Abdel-Magid, p. 347), by way of the old COCOA-type arguments. However, outside of Nirvana it is noteworthy that 'the fact that a few things in this world can be measured by addition does not prove that everything must be', and that 'additivity in the sense used in arithmetic should not be presupposed, for the laws of combination may be more complex in accounting than in say physics'.⁵ In sum, chanting the classical measurement school mantra, and ignoring all else, really does not make the COCOA/ER 'grass' greener nor that of PP translation withered and sere.

The People Could be Different Fallacy

Clarke refuses to accept that information generated from any accounting system not based on current cash equivalents is an economic good. However, most accountants appear to have judged COCOA accounting information to be a decidedly inferior economic good when it comes to choice of an alternative to historical cost accounting. Yet we are expected to think that the world would be a more efficient place if only people would hold a Clarke/Chambers view of the world. Not surprisingly, if we permit Clarke to insert COCOA and 'complete technical propriety' into our concept of efficiency he can argue that *all* translation systems, *except* COCOA/ER, are incomplete and therefore inefficient.

However, if extant preferences for accounting information are incorporated into the concept of efficiency, matters are placed in appropriate perspective such that COCOA, and so COCOA/ER

³The relationships between evaluative criteria in Patz (1977a) and the three 'claims' as drawn by Clarke (p. 73) from the Patz paper are somewhat complex. Both the criteria and the 'claims', however, evolve from three neutrality characteristics of PP translation discussed in Patz (p. 16). Restated briefly, these are independence from: (1) future managerial actions and environmental events; (2) post-translation reporting location; (3) pre-translation accounting measurement system.

⁴Mock (1976), for example, presents some 30 potential characteristics which might be considered and operationalised in accounting production choice problems, drawn from measurement theory and practice, accounting, information and communication theory, statistics and computerised information systems.

⁵The first reference is to Stevens as cited by Abdel-Magid, p. 355, the same Stevens cited by Clarke but Stevens (1975) not (1946); the second reference is to Mock, p. 46.

translation, is not likely to be judged a real institutional arrangement at all. It is equally required that most accounting academic and other social scientists be different too, to get Clarke's particular 'technical propriety' norm into the concept of efficiency:

Great progress in psychology, criminology, and even political science was achieved only after social scientists divorced their research from that view and put the relationship between the empirical operations of quantification and the rules of arithmetic in the original historical perspective that gave rise to the number system (Abdel-Magid, p. 347).

The Free Lunch Fallacy

Slipping into the Free Lunch Fallacy typically begins with ambiguity of terms (Demsetz, p. 4), especially as regards their relationship to real issues. Clarke employs just such ambiguous terms, such as 'contrivance', 'label', 'fiction', where it is never quite clear exactly what they mean or exactly how they relate to issues. What, for example, does the term 'fiction' mean, as in Clarke's assertion that 'A "place significance" in relation to the respective purchasing powers of domestic and foreign monies is a fiction'? Is the concept of place significance being associated with accounting measures a theoretical 'contrivance'? If so, some credit must go to the FASB (1974), who refer to an equivalent notion as giving rise to a basic translation issue, and the FASB (1981) 'functional currency' notion must be judged equally fictional and contrived. Is 'place significance' empirically non-existent? If so, then common calculations to capture it (purchasing power parity calculations) and actions motivated by its averred existence (such as locating operations abroad in the first place, formulation of personal tax relief policies) are ill-founded. Indeed, it is curious overall that Clarke can seemingly accept that accounting measures denominated in currency units of measure have meaning conditional on the structure of prices at the time taken,⁶ yet reject the notion that their meaning is equally conditional upon what geographical structure of prices constitutes the referent purchasing power standard.⁷

The detailed arguments which follow the 'fiction' assertion continue to leave its meaning elusive. These deal with quantitative and qualitative aspects of place (which tend to reaffirm the existence

of place significance) and with calculation 'improprieties' that Clarke associates with price parity indices. There appear to be only two reasonable interpretations of these arguments: they seek to demonstrate either that (1) there are not two distinctly different price structures to which monetary accounting expressions could refer; or (2) that measurement error will arise in computations of relative purchasing power (price parity indices). Under the first interpretation, the arguments merely constitute 'straw men' as will be shown subsequently. Under the second interpretation, to relate measurement error, alone and by itself, to the translation issue in some decisive way is to slip fully into the Free Lunch Fallacy: that is, if some measurement error is admitted, can it be deduced that elimination of this measurement error by use of exchange rates constitutes a superior translation information production system? To do so is to ignore the relationship between rate choice and the information content of post-translation accounting measures. It is to assume a zero cost associated with the ER alternative (and zero benefits with the PP alternative), notwithstanding that ER-based translation has historically been subjected to widespread criticism in terms of information content. Even Clarke himself argues that exchange rates cannot be related to typical accounting measurements, and that their use is technically wrong and not likely to produce meaningful or useful results (footnote 6 previously).

Measurement error is a question of costs and benefits (elaborated in Patz, 1981), and its avoidance is not an obvious 'free lunch' either in or out of Nirvana:

Some iron ore is left unearthened because it is too costly to bring to the surface. But we do not claim ore mining is inefficient merely because mining is incomplete (Demsetz, p. 7).

Beyond Nirvana

This section considers whether some points made by Clarke remain convincing despite his overall approach and the foregoing logical fallacies. The conclusion reached is that his separate topical arguments neither serve to discredit the PPTT nor provide any insight into real translation issues, basically because of further logical fallacies beyond the three already considered.

The Blurred Vision Fallacy

The crux of this fallacy is that while adoption of an indistinct view of a situation will certainly fail to draw distinctions, it does not follow that significant differences are absent between the elements of a situation. In one sense this fallacy too is all-pervasive in the Clarke paper, since it is a

⁶The use of current rates to translate past measures or past rates to translate current measures is technically wrong and, except by pure chance, not likely to produce a meaningful or useful result' (p. 76).

⁷Especially given the Clarke admission that 'we have accepted the idea that domestic money and foreign money are not homogeneous because of their respective place locations' (p. 75).

natural outcome of the narrow view of measurement adopted. For example, no distinction is ever made between extensive (physical) properties/objective magnitudes and intensive properties/subjective magnitudes, between structural and functional measurement and between money as a physical medium of exchange and money as a functional unit of measurement. As such his classical measurement view is itself a Blurred Vision Fallacy, and one which influences his arguments throughout.

However, this fallacy arises at the individual argument level as well. Clarke argues that restatement is often properly a part of a measurement system, and therefore that the measurement/restatement distinction drawn in PPTT is inconsequential and of no practical significance. To support this he considers 'a situation in which the length of an object is required to be stated in yards, but only a metre stick is on hand'. He then concludes that the required conversion from metres to yards is part of the process required and therefore is measurement too, and that there is no meaningful difference between the two operations.

Abdel-Magid (p. 351) exhibits much clearer vision in this regard:

There are two complementary aspects of ratio scales. First, ratio scales are measurement devices. An analysis of the tenets of ratio scales as measurement devices will naturally involve questions about the object, property and operation of measurement. But ratio scales can also be viewed as a mathematical group structure (a similarity group) that allows a mathematical transformation of the numbers generated by the scale and still leave the scale form invariant.

The first operation in the Clarke example is an empirical one: the assignment of numbers to objects using a ratio scale as a measurement device. The second operation is one of calculation where the ratio scales are used as a similarity group for transformation purposes, a restatement device. Hence the measurement/restatement distinction is hardly inconsequential or of no practical significance. Only the measurement operation is capable of extracting information from nature; but then too, in the complex context of translation/consolidation, it is also capable of failing to do so or even of destroying information already present in the pre-translation accounts. The restatement operation is only capable of rephrasing or restating existing information already gleaned from nature, but then the tricky problems of object, property and measurement operations are also absent: 'the problem is mathematical, and the only relevant problem is the index number difficulty' (Abdel-Magid, p. 351). Thus the distinction is very significant in the translation context, as the two operations each imply a different

goal, either to extract new information from nature or to preserve that already extracted. Further, to the extent that measurement is a more subjective and risky endeavour than restatement, the practical significance of the distinction grows accordingly.

The 'Some' of the Parts Equals the Whole Fallacy

Clarke maintains, however, that measurement is not subjective but objective, and is commonly described in such terms. The fallacy here is to conclude that, because measurement has some objective aspects, it is a wholly objective process. Measurement most certainly has subjective elements (with associated risks), and generally the more complex and ambiguous the empirical setting the more subjective and prone to error measurement becomes. Outside Nirvana, as Mock (1976, p. 42) notes:

Even a casual examination of measurement results in the conclusion that measures rarely ever satisfy the formal requirements of a scale. Not only are most numerical assignments 'subjective' but most are also conditional and error prone.

Along with arguing that measurement is objective, Clarke also maintains that it is not creative, and together these assertions lead him to conclude that the measurement/restatement contrast lends no strength to the argument that restatement has neutrality characteristics which measurement does not. He maintains that, because nature already exists, measurement cannot create anything. However, accounting measurement clearly is creative human activity (else why bother?), and its purpose is to create information regarding structural, but more often functional, properties of accounting objects. It is a purposive and subjective process requiring explicit and implicit choices in its implementation, and is consequently less neutral in the dimensions discussed by Patz than a units of measure scale transformation. And it is here where a truly fundamental translation question does arise: is it sensible to extend this 'creativity' to the translation operation and attempt to calculate derived measures of a further functional property of foreign-held objects?

As Abdel-Magid (p. 355) observes: 'After the point of exchange, the empirical base is lost and the conventional accounting model relies heavily on calculation'. Chambers, Clarke and a few others get upset about this loss, and the aforementioned difficulties of object, property and operation that conventional (functional) accounting measurement entails. Hence the enthusiasm over the prospect of reducing all accounting functions to counting cash and 'cash equivalents', including now re-counts via translation. Lee's (1972) 'Cash Flow Accounting' model too seems somewhat based on concern over functional accounting measurement employing

empirically-removed valuation models. In this system one can stick wholly with immediate physical reality and dispense with even the 'current cash equivalency' construct (or not, see Lee, 1981) and simply count and variously classify flows of money.

In real-world translation, however, the relevant question is whether concern over ER-based translation, which *does not even have* an empirical (currency exchange) base for the ER (Price \times Quantity) derived measurement operation to lose is justified. As Clarke notes, unless $(P \times Q)$ is a cash/cash equivalents count the operation makes no sense in classical measurement terms. In effect, PPTT despairs over the information content of the ER $(P \times Q)$ result in functional measurement terms, absent the condition that $ER = PP$. Simply put, the PPTT argues that PP $(P \times Q)$ in turn is *both* technically *and* informationally defensible.

The 'Hole' Equals the Sum of the Parts Fallacy

The crux of this fallacy is that, if one builds selected and sufficiently restrictive premises into an argument, one can then create a 'hole' through which desired and internally valid conclusions can be forced.⁸ However, the 'whole' that is built via the 'hole' is as restrictively true and useful as are the explicit or implicit premises. Clarke commits this fallacy when he attempts to equate purposelessness with 'neutrality', a concept of neutrality that is totally absent from the PPTT, and reasons from there that the use of exchange rates must be more 'neutral' than the use of PP indices. His argument runs (p. 74) as follows:

1. it is doubtful that ER translation could historically have been directed at measuring the future remittable dollar value of foreign-held resources;
2. since 'every statement of the kind $\pounds X = \$Y$ is merely one of equivalence in exchange of one currency for another';
3. which is completely neutral, like 'the statement of the selling price of one's home' from which no inference of intent can be drawn;
4. the Patz theory contains (two, p. 22) propositions of intent;

⁸Of course, Chambers creates a similar 'hole' in a similar fashion in his COCOA theory, but on a larger scale which includes both 'technical propriety' and 'information content' arguments and conclusions. If one accepts his premise that accounting should be measurement (as Chambers *classically* defines it), and his premise that business management is a constant frenetic process of adaptation to radical change (as opposed say to the Edwards and Bell 'fine-tuning' characterisation), then but only then do the arguments and conclusions relating to money as a vehicle of adaption, monetary numerosity, additivity, current cash equivalents, information, etc., follow.

5. therefore, 'we are forced to conclude it is less neutral than using official rates'.

Argument 1 refers to reality, and a reality about which one can only construct explanatory hypotheses. The Patz (1977a) hypothesis (elaborated in Patz, 1975, pp. 105–114) is that most conventional ER translation theory as a whole constitutes a rational debate if viewed as attempts to derive measures of the impact of price changes (for the commodity 'foreign money'), on the future remittable domestic currency value of foreign-held resources. Basically, the hypothesis is that (i) early on, this measurement philosophy became entrenched, (ii) at that stage it was plausible because the absent empirical base of exchange was generally an imminent one, and (iii) it has remained virtually unquestioned since, notwithstanding material changes in both the extent and nature of foreign operations:

However, just as in ordinary domestic accounting procedure it is necessary to estimate items of income and expense in order to secure statements of reasonable accuracy, so it may be desirable to estimate the effect of foreign exchange fluctuations, even when the final and definite results cannot be known (Saliers, 1944).

Of course, the Patz explanation could be wrong. To accept the Clarke alternative explanation in argument 2, however, is to return to Nirvana. One must leave reality since COCOA/ER has never existed as a real institutional arrangement. One must accept the implicit premise that theorists and practitioners alike could for decades have been blind to the fact that historical cost ($\pounds X$) is not an exchangeable money sum, and so accept that translation actually has been and is about classical measurement aimed at constructing $\pounds X = \$Y$ statements of equivalence in exchange.

Argument 3 is a Nirvana proposition as well, since it does make sense in this alternative reality to construct a statement of the selling price of a home not for sale, or not to construct a statement at all regarding an asset used every day because it does not have the particular physical property of separability. If one accepts the premise that translation is an issue solely assessable in formal measure-theoretic terms, as merely an analytical problem of constructing measurement scales consistent with classical definitions and axioms, such things as purpose, usefulness, information content and intent are indeed beyond the scope of analysis.

In Nirvana it follows then, as in argument 4, that having one or more purposes in constructing $\pounds X = \$Y$ statements under the PP Theory is not 'neutral', as no purpose beyond that of supplying a physical interpretation for arithmetic is neutral. Thus the 'forced' conclusion of argument 5 is indeed just that. If one is prepared to equate lack

of intent or purpose with neutrality, and to accept *this* neutrality as a desirable and possible characteristic of real accounting translation, then sure enough PP translation is not neutral, extant ER systems are irrational, and ER/COCOA is neutrality Nirvana.

The Straw Man Fallacy

This fallacy, as most already know, is committed via construction of a non-existent or non-relevant example problem or situation, which is then solved or used to the constructor's advantage, seemingly to refute some existing argument or to press a counter-argument. Holistically speaking, two of the three main sections of the Clarke paper are simply giant straw men ('Whither Neutrality' and 'Measurement Systems Do Matter'). The fact is that, unless it is demonstrated that the PP translation operation is *not* an admissible scale transformation, then the neutrality arguments that are found objectionable are nevertheless true by definition. Conceptually, the $(PP_d/PP_f)(P_f \times Q)$ restatement operation is comparable to the much more familiar $(PP_f/PP_i)(P_i \times Q)$ restatement, the price-level accounting operation which is widely if not universally accepted as technically valid. Since such similarity transformations are wholly computational, entirely analytical, they are by definition neutral in all relevant respects. Likewise, since all known accounting measurement systems employ monetary units of measure, an acceptable transformation of foreign to domestic monetary units of measure is applicable to all known accounting valuation measurement scales. Accordingly, the truly relevant issues are two: the index problem (measurement of purchasing power/relative purchasing power); and the information content or usefulness of results question. With these, Clarke constructs numerous straw men at the individual argument level.

Space limitations preclude a full treatment of these. However, their essential character is reasonably well captured as follows:

1. The 'Contradiction' Straw Man—this entails ignoring an explicitly signposted (twice) distinction between linguistic place significance and measurement place significance, in order to argue the presence of contradiction.
2. The 'Medium of Exchange' Straw Man—this entails introduction of the exchange properties of money when addressing PPTT place significance regarding money as a unit of measure, to argue: 'Domestic and foreign money are not alternatives as a medium of exchange within (say) the domestic national boundaries in the same way yards and metre sticks are'. Using metre sticks as a medium of exchange is a novel idea, but not one in PPTT.

3. The 'Goods and Services' Straw Man—this entails introduction of two notions: the inability to consume or substitute domestically without the added input of transportation; and the social, political, environmental and legal circumstances surrounding the possession of goods and services in a particular location. Translation, however, deals with quantifiable properties of goods and services as they are, where they are, when they are, because of or in spite of surrounding circumstances, without wholesale domestic consumption imminent.
4. The 'Surrogation' Straw Man—this entails introduction of the notion of parities used as surrogates for exchange rates, notwithstanding that the latter are available on a daily basis for translation purposes. As made clear in the Patz paper, and elsewhere (Patz, 1977b), only a reverse proposition is relevant to PPTT.
5. The 'Calculation Impropriety' Straw Man—this entails an 'incest' or independence of observations argument regarding PP indices, where it does not apply. A PP index is a *descriptive* statistic, a measure of the relative place-dependent purchasing power of two currencies at one point in time, just as a price level index is a time dependent measure of the relative purchasing power of one currency at two points in time. It is not an *inferential* statistic, e.g. a correlation coefficient where the argument would apply to spurious correlation as regards the extent that variation in State B is a function of variation in State A.

Back to the future

With Nirvanistic ease, Clarke maintains that 'the "parities versus exchange rate" debate might properly be put aside as a non-event if Patz's claims do not stand up'. The analysis of prior sections suggests that they do stand up, at least relative to Clarke's particular objections, and in light of some directly relevant subsequent findings. Further, that analysis suggests that, if anything might properly be set aside, it is the Nirvana approach to questions of accounting measurement and policy choice.

Yet by no means can the PPTT be considered verified either. The present paper only seeks to reinstate as necessary the PPTT approach as a plausible candidate for membership in any future choice sets of real and practical institutional arrangements for translation. Back to the future, whether or not the PPTT is a 'non-event' outside Nirvana is conditional upon what we now know and what we learn in the future from research that bears significantly on the translation policy choice. Even a cursory examination of the translation literature indicates that a great deal remains to be done at both the analytical and empirical levels

before any particular approach may properly be set aside.

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A Journal of Accounting and Business Studies

Volume 23
Number 2
September 1987

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The Role of Accounting Information in Valuing Unlisted Shares*

Richard Pike, John Sharp and Jeffrey Kantor

Abstract—Little research has been conducted on how professional accountants value unlisted shares. The study reported in this paper analyses the accounting and other data drawn from 185 actual unlisted share valuation reports within seven major Canadian accounting firms to estimate a model of and to explain variations in the values placed on unlisted shares.

The findings suggest that valuation of unlisted shares can be explained largely in terms of historic accounting data, the main sources being earnings, earnings stability and asset book value. A high degree of consensus on the importance of variables was found across accounting firms. The implications of these findings are discussed.

Background

Valuation of unlisted shares which are neither traded on an exchange nor over the counter has long been a difficult business. Such valuations involve a complex, largely subjective process and are usually left to professional accountants specialising in such matters. Their task is to determine the relevant information which shapes investors' beliefs concerning the size and uncertainty of the stream of cash flows arising from the shares, and to reach a value based on this information (Beaver, 1981).

In a recent issue of this journal, Day (1986) calls for research into the actual decision processes of investment analysts by carrying out in-depth studies of individual analysts at work. The purpose of the study reported in this paper is to analyse the actual unlisted share valuations conducted within seven major accounting firms and to estimate a model based on the underlying accounting data, to explain variations in share valuations arrived at by these firms.

Kantor and Pike (1987) reported findings based on a survey of 267 Canadian accountants regularly engaged in valuing unlisted shares. One observation was that valuers regard future expected earnings as the most important information variable in the valuation of unlisted shares. Historic accounting information, such as book value of net assets and published earnings and dividend information, whilst not unimportant, did not rank at all highly out of the twenty six variables considered. This observation corresponds with that by Arnold and Moizer (1984) in their survey of UK investment analysts that an earnings-based funda-

mentalist approach using the 'true' P-E ratio was the primary valuation method.

Research questions

These findings give rise to four questions addressed in the current paper.

Question (1)

To what extent are the perceived importance rankings listed by valuers in such surveys borne out in practice, that is in *actual* share valuations? It is not uncommon in the 'messy' business of accounting practice to find that difficulties in obtaining reliable estimates of the information sought lead the accountant to develop simpler, less theoretically pleasing proxies based on readily available and generally accepted data. In the context of the present study, for example, the problems in forecasting future earnings, growth prospects and cash flows may give rise, in practice, to historic earnings together with their growth and stability over time being regarded as acceptable substitutes for the size and uncertainty of future earnings. An even simpler approach might be to value unlisted shares according to their book value of assets per share.

Question (2)

Is it possible to construct a model for predicting unlisted share valuations from historic accounting information? It is frequently argued that a formula approach is inappropriate in the field of share valuation because so much of the final valuation comes down to the valuer's own judgement (see, for example, Bosland, 1964; Revenue Ruling 59-60, 1959). However, even if such a model were inadequate as a valuation tool, it would at least have the merit of identifying that part of the

*The authors are indebted to the helpful comments made by two unidentified referees.

valuation process which lies beyond the model. If, in fact, the model developed is found to be a reasonable predictor of value it may well be possible to apply weightings to selected accounting data to produce a starting figure in valuing unlisted shares. This could be particularly useful in the case of contested share valuations.

Question (3)

Is there a high degree of consensus across valuation firms? A common feature of many of the studies on 'experts' in accounting and human information processing is the lack of interjudge consensus, rendering a composite judgement, based on the combined judgements of subjects studied, of limited value (Libby, 1981). If there is a lack of consensus in the present study this will affect the explanatory power of any model estimated. In particular, we are interested in establishing whether the same model can be applied across the seven firms examined. We suggest that the common professional training and the existence of a regulatory professional body in Canada on valuations (Canadian Institute of Business Valuators) leads to a high degree of consensus in the valuation process.

Question (4)

Does the purpose of valuation influence value itself? Here we examine two basic forms of valuation: 'open-market' transactions, where shares are exchanged, and 'notional' transactions, where shares are valued for taxation or other purposes. This is the first work (known to the authors) to be based on actual open-market and notional business valuations. Previous related studies were conducted on court case data (Englebrecht, 1976; Lathen, 1982) or used lens studies based on verbal processes (Biggs, 1979; Clarkson, 1962) or were fabricated designs using information cues (Ebert and Kruse, 1978; Slovic, 1969; Wright, 1977). Madeo (1979) questions the relevance of studies conducted on court case data. Firstly, different attorneys have different court skills; secondly, publicly available court case data typically provide a far from complete picture of the proceedings; thirdly, use of court case data could introduce a systematic sample bias since those valuations that go to court may, in some respects, be different from valuations that are decided without litigation. In the absence of any clear theory suggesting how such valuations differ from open-market valuations, we will assume that valuation purpose does not significantly affect share valuation.

The foregoing discussion gives rise to the following working hypotheses.

H1: The valuation of unlisted shares can be explained largely in terms of historic accounting information, the main variables being

earnings, growth in earnings, stability of earnings, book value of assets, leverage, and liquidity.

H2: The common professional training of valuation accountants and the close links developed between valuation firms produce a high degree of consensus. No statistically significant differences between firms exist in the value placed on unlisted shares.

H3: The purpose of valuation, whether for taxation or other notional purposes or for purchase/sale purposes, has no statistically significant effect on the actual valuation.

Sample selection

Prior research used data drawn exclusively from tax court transcripts. Essentially the whole population of US court data was used over a period of years. For example, Englebrecht (1976) used sixty-seven cases (from January 1, 1950 through December 31, 1974) tried before the US tax court involving the valuation of closely held corporations for estate and gift tax purposes. Lathen (1982) used ninety-three cases from January 1, 1950 to December 31, 1979, tried before the US Tax Court as either regular opinions or memorandum opinions. The data in this study differ in two respects. Firstly, they include valuations for a variety of purposes, not purely for tax purposes. Secondly, they include only valuations performed by valuation units within major Canadian accounting firms. All valuers were members of the Canadian Institute of Chartered Business Valuators.

Seven major accounting firms in Toronto, Canada, were requested to participate in this project. Following extensive discussions within the business valuation community, selection was based on those firms with business valuation units considered to have a strong reputation and dominant market share in the business valuation field.¹ A standard data collection form was designed to be filled out from actual valuation reports. A pilot study was conducted in one firm to ensure that the variables requested were, in the main, readily accessible to the valuer when reviewing valuation reports. Valuers were asked to supply data on the 40 or 50 latest business valuations in their files. Typically, this represented all the valuations conducted by the valuer over the previous two years. Restricting the data to the most recent valuations reduced both the problems of price-level changes and

¹Sincere thanks to the Toronto, Canada offices of Clarkson Gordon, Deloitte Haskins & Sells, Dunwoody & Company, Ernst & Whinney, Laventhol & Horwath, and Peat Marwick Mitchell & Co. for the data used in this paper. The data was supplied on condition that (a) the actual companies valued are not identified, and (b) a particular valuation is not specifically identified as having been done by a particular valuation firm.

of sampling bias from accountants selecting the sample. The time commitment requested of each valuation firm was 20–30 hours of manager or partner time.

In total 290 valuations were gathered, the summary industry breakdown being:

<i>Industry description</i>	<i>No.</i>	<i>%</i>
Finance (Banks, Insurance, Real Estate)	39	13.4
Manufacturing	134	46.2
Other	7	2.4
Services (Hotel, Amusement, Construction)	77	26.6
Trade (Wholesale and Retail)	33	11.4
	<u>290</u>	<u>100.0</u>

After eliminating those with extensive missing data, very low turnovers (below \$10,000) and negative current earnings or equity values (suggesting that they may no longer be going concerns and therefore subject to a different valuation approach), the sample was reduced to 185 valuations for the purpose of this study. All monetary values were then adjusted for inflation to bring everything to 1984 price levels.

Variable selection

The variables tabulated for each actual business valuation were selected by reviewing prior literature and court case data.² Extensive work has been conducted on detailed reviews of court cases determining the extent to which certain variables have been taken into account by the legal community. Several authors (for example, Gill, 1960; Martin, 1975; Kantor, 1984) have summarised the occurrence of certain variables mentioned in American court transcripts.

The accounting information set derived from this literature was then modified in the light of the information commonly documented in the business valuation report files of the seven participant accounting firms. Valuation theory prescribes expected future earnings (or cash flows) and its associated level of market risk as the major determinants of share values. We suggest that the difficulties in making such estimates lead valuers to adopt proxies based on historic accounting data. For example, historic accounting earnings and earnings growth are proxies for future earnings; earnings variability, leverage and liquidity are risk proxies; and book value of equity provides the value base from which valuations proceed. Six explanatory accounting variables were therefore selected as being consistent with the literature, practice and working hypotheses, viz. historic ac-

counting earnings, growth in earnings and variability of earnings over the previous three years, book value of equity, leverage (total debt/total assets) and liquidity (current assets/current liabilities). Dummy variables were then specified for valuation purpose (tax related or purchase/sale) and valuation firm.

Throughout this study the dependent variable is the valuation placed on shareholders' equity by a professional valuation accountant in one of the seven firms, as taken from a valuation report. For purpose of simplification we refer to this as 'share value'.

Model specification

Given the very wide range of values in the data (for example, company values range from \$10,000 to \$500 million) the linear regression initially adopted gave rise to residuals whose variance was not constant. One approach to this problem is to normalise the data, e.g. by dividing by earnings and regressing the Price-Earnings (P-E) ratio on a variety of other ratios. This proved to give reasonable results, but there was clear evidence of skewed residuals due to the fact that the sample comprised only profitable businesses with P-E ratios greater than zero. This suggested respecification in terms of a model of Log(Share Capital Value) against the Logs of the various independent variables.³

The model estimated was:

$$\begin{aligned}
 &\text{Log(SHAREVAL)} \\
 &= a_0 + a_1 * \text{Log(EARNINGS)} \\
 &\quad + a_2 * \text{Log(EARNGROW)} \\
 &\quad + a_3 * \text{Log(EARNVAR)} \\
 &\quad + a_4 * \text{Log(BOOKVAL)} \\
 &\quad + a_5 * \text{Log(LEVERAGE)} \\
 &\quad + a_6 * \text{Log(LIQUIDITY)} \\
 &\quad + b_2 V_2 + b_3 V_3 + b_4 V_4 + b_5 V_5 + b_6 V_6 + b_7 V_7 \\
 &\quad + cP + N(0, \sigma^2)
 \end{aligned} \tag{1}$$

Where:

SHAREVAL

= Inflation adjusted total shareholders' equity value

EARNINGS

= Inflation adjusted company earnings for previous financial year

²This literature is discussed in Kantor and Pike (1987) and is not therefore repeated here.

³A semi-log model of Log (Share Capital Value) against the untransformed independent variables was also tried. Though this was acceptable by the normal criteria for judging regression models it had a much lower R^2 so was not pursued further.

EARNGROW

= Inflation adjusted growth in earnings over previous three years, i.e. $(E_t/E_{t-2})^{0.5}$

EARNVAR

= Standard deviation of inflation adjusted earnings over previous three years

BOOKVAL

= Inflation adjusted book value of shareholders' equity less preference share capital

LEVERAGE = Total debt/total assets

LIQUIDITY = Current assets/current liabilities

$V_2 = 1$ if valuer firm No. 2, 0 otherwise

V_3 – V_7 were defined similarly

P = Purpose of valuation (tax purposes or for purchase/sale)

a_0 – a_6 , b_2 – b_7 , c were all regression constants

The null hypothesis used to examine our three working hypotheses is: a_1 – $a_6 = 0$, b_2 – $b_7 = 0$, $c = 0$

Results

The accounting variables were correlated to examine simple associations and the extent to which multicollinearity of independent variables may create difficulties in the regression analysis. Table 1 reveals that, in keeping with our first hypothesis, there are significant associations between Log(SHAREVAL) and Log(EARNINGS), Log(BOOKVAL) and Log(EARNVAR) all at the 0.001 level, and Log(EARNGROW) at the 0.01 level.

The correlations between independent variables were all numerically less than or equal to 0.52 with the exception of that between Log(BOOKVAL) and Log(EARNINGS), and that between Log(EARNVAR) and Log(EARNINGS) which were both about 0.85. To guard against possible problems due to misspecification of the model and/or multicollinearity an approximate 33 percent random hold out sample was used.⁴ Estimation was by stepwise ordinary Least Squares regression. The model was based on 123 cases for which observations on all variables were available. The hold out sample comprised 39 cases. Regression results are given in Table 2. In summary, only three historic accounting based variables were found to be statistically significant: book value of equity; earnings; and variability of earnings.

⁴The figure 33% was arrived at on the basis that it provided a substantial number of hold-out cases (ca. 40) while providing a reasonable number of degrees of freedom for estimation (ca. 70) even if all the 13 independent variables that might have entered the regression equation had in fact done so.

	Log(SHAREVAL)	Log(LEVERAGE)	Log(EARNINGS)	Log(LIQUIDITY)	Log(EARNGROW)	Log(BOOKVAL)
Log(LEVERAGE)	-0.03					
Log(EARNINGS)	0.87**	0.02				
Log(LIQUIDITY)	-0.10	-0.52**	-0.12			
Log(EARNGROW)	0.26*	-0.00	0.34*	0.05		
Log(BOOKVAL)	0.85**	-0.17	0.82**	-0.07	0.18	
Log(EARNVAR)	0.84**	0.03	0.85**	-0.11	0.22	0.13

*Significant at 0.01 level.

**Significant at 0.001 level.

Table 2
Regression Equation: Dependent Variable is Log(SHAREVAL) (n = 123)

<i>Explanatory variable</i>	<i>Predicted sign</i>	<i>Regression coefficient</i>	<i>Standard error</i>	<i>T-significance</i>
Log(EARNINGS)	+	0.396	0.085	0.000
Log(BOOKVAL)	+	0.304	0.063	0.000
Log(EARNVAR)	—	0.242	0.072	0.001
Constant		1.101	0.221	0.000
Adjusted R ²		0.825		
Overall F-test significance		0.000		

Table 3
Regression Equation: Dependent Variable is Log(SHAREVAL) (n = 185)

<i>Independent variable</i>	<i>Predicted sign</i>	<i>Regression coefficient</i>	<i>Standard error</i>	<i>T-significance</i>
Log(EARNINGS)	+	0.388	0.071	0.000
Log(BOOKVAL)	+	0.340	0.054	0.000
Log(EARNVAR)	—	0.251	0.058	0.000
Constant		0.898	0.193	0.000
Adjusted R ²		0.814		
Overall F-test significance		0.000		

We conclude from the fact that b_2 to b_7 were not found to differ significantly from zero that the data are consistent with the hypothesis that there is no difference between valuations by different firms of values (H2). Similarly, the fact that the value of c was not significantly different confirms our hypothesis (H3) that the purpose of valuation does not affect share value.

For the selected cases the coefficient of Multiple Correlation was 0.91 and for the hold out sample it was 0.99. Thus, the out-of-sample fit was actually better than the within-sample fit. No obvious signs of deviation from the underlying assumptions of OLS could be detected from the residual plots.

Equation 2 was then re-estimated on the full sample of 185 cases for which observations were available for the four variables involved. The regression results are summarised in Table 3.

Inspection of residual plots again revealed no sign of any deviation from the underlying regression assumptions.

The null hypothesis that regression coefficients of the regression model are all equal to zero is rejected for a_0 , a_1 , a_3 and a_4 ($P < 0.001$). Logs of the historic earnings, earnings variability and book value equity variables have significant regression coefficients.

The coefficient signs accord with *a priori* predictions for all except Log(EARNVAR) where a significant positive coefficient is obtained, i.e. the greater the variability in earnings the greater the valuation placed on the unlisted share capital. This observation warranted further investigation. One possible explanation is that variability of earnings

may be a proxy for earnings growth, which was predicted to have a positive sign. Table 1 shows that the association between growth and variability of earnings is significant. However, Log(EARNGROW) still fails to enter the regression equation when Log(EARNVAR) is omitted. Further research is called for into the reason for the positive sign of the earnings variability coefficient.

Summary and implications

This study goes some way to meet the calls for research into actual decision processes of investment analysts. The study reported in this paper analyses the accounting data used by seven major Canadian valuation firms and estimates a regression model to explain variations in unlisted share values. The results of the hold-out sample and the closeness of the estimates of the regression coefficients in equations 2 and 3 suggest that misspecification is not a major problem.

Evidence from regression output strongly supports the three hypotheses identified at the outset of the study:

- (1) Only three historic accounting variables are required to explain over 80 percent of the variance in the Log of total share value across a range of values from \$10,000 to \$500 million. These variables are the Log of earnings, Log of earnings variability and Log of book value of equity.

- (2) No evidence was found to suggest that differences exist between firms regarding valuations. The relatively high degree of consensus found across firms is consistent with the common accounting education and training received (all were chartered accountants), the presence of an active professional valuation body, and the close contact enjoyed between the firms surveyed (all firms were based in Toronto and valuers met frequently).
- (3) Information about the purpose of valuation does not seem to lead to better estimates of the value. From this we may infer that the extensive studies conducted on court case data for taxation purposes has application to valuations for share purchase/sale transactions.

The findings broadly confirm those from earlier studies based on Court Case data using more narrowly-based sample designs: book value and historic earnings variables are perceived by Canadian valuation experts to be the major information stimuli in determining the value of unlisted shares.

Certain implications arise from these findings. Firstly, while Kantor and Pike's (1987) survey found general support for the view that future earnings prospects is the main determinant of share valuations, in our present study it is clear that historic accounting data are 'good' predictors of the value placed on shares by expert valuers. One explanation for the apparent discrepancy between valuers' beliefs and practices is that the difficulties in forecasting future earnings, allied to the need to justify valuation judgement to others (e.g. colleagues, clients, tax authorities and courts) give rise to a predominance of publicly available, less subjective information being used as a proxy for future earnings. It is interesting to compare this finding with that of Beaver (1981), who, with regard to listed shares, suggests that a motivation for using accounting numbers as parameters of the share valuation model stems from the belief that accounting earnings (properly interpreted and adjusted) provide a measure of the dividend-paying capacity of the firm.

The second implication arising from the results is whether a valuation formula can be employed for the majority of unlisted share valuations. The overwhelming importance attached to book value of assets and historical earnings, and the fact that three accounting variables explain over 80 percent of the variance of the dependent variable, suggests that a simple formula could be applied with some benefit. For example, if we convert equation (3) to an equation for estimating equity share value we obtain:

$$\text{SHAREVAL}$$

$$= 10^{0.898} * \text{EARNINGS}^{0.388}$$

$$* \text{EARNVAR}^{0.251} * \text{BOOKVAL}^{0.340} \quad (4)$$

$$= 7.90 * \text{EARNINGS}^{0.388}$$

$$* \text{EARNVAR}^{0.251} * \text{BOOKVAL}^{0.340} \quad (5)$$

If we increase the size of each of the independent variables by a factor of 10 the estimate of SHAREVAL increases by 10 to the power of the sum of the exponents of the independent variables, i.e. $10^{0.979} = 9.528$. This seems a satisfactory result. We would expect a factor slightly less than 10 because larger-sized companies tend to become rather limited in their opportunities for growth and more exposed to competition. Of course, a valuation formula such as the above, based on a regression model using 185 valuations, may still be subject to considerable error in individual cases. Even so, the particular skills and judgements of the valuer appear to have relatively little impact on share value compared with the major explanatory accounting variables. This is consistent with the view offered by Glover (1983):

it would be incorrect to conclude that the value of something is anybody's guess or that valuation is a matter of hunch or 'seat of the pants' feel. Most (unlisted) valuations done by experts proceed 90 per cent of their distance on well defined principles and the result can usually be stated in terms of a narrow range of vision (p. 4).

A third implication concerns the quality of accounting data. The strong information content of book value of assets and historical earnings in share valuation should lead accountants and valuers to examine closely the definitions used and underlying policies employed within organisations. Differences in such policies as asset revaluation, treatment of research and development and leasing, and accounting for price-level changes could have an important bearing on comparative valuations.⁵

If the vast majority of valuations proceed most of their distance on well-defined principles which anyone could follow, it naturally raises the question of whether there is still a useful role for the accountant in the valuation of unlisted shares. A recent investigation into the readability of Canadian reports (Courtis, 1986) claims that the overall reading ease of annual reports is predicted to be too low for most recipients, and that only 8 percent of the adult population had reached the required reading level. Similarly, Lee and Tweedie (1981) seem to show that understanding of financial statements is far from perfect, and is best among those with an accounting qualification. From this we

⁵In this study all accounting data were prepared under the historic cost convention.

may infer that unless accounts can be greatly simplified the specialist accountant does have an important valuation role in the interpretation of accounting numbers, along with other information, to provide unbiased estimates of share values in the absence of a ready market.

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1987

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Product Pricing Behaviour Under Different Costing Systems

Dennis P. Tishlias and Peter Chalos

Abstract—Product pricing under *ex ante* imperfect marginal cost information is examined. The major findings indicate that under conditions of increasing (decreasing) average total (variable) cost, absorption (variable) costing results in outcomes closer to economic optimum. In addition, cost accounting systems interact with price elasticity of demand, resulting in greater (lesser) decision deviations from economic optimum under absorption costing when costs are decreasing (increasing).

Introduction

A continuing controversy in the accounting literature concerns the relative merits of cost allocation and its impact on decision making behaviour (Zimmerman, 1979). Despite the arbitrary nature of cost allocations (Thomas, 1969), behavioural pricing studies suggest that different decision outcomes are related to the method of allocation (Bloom et al, 1984; Barnes and Webb, 1986). The unitisation and allocation of fixed cost to products can result in decisions that lead to less than optimal output levels, if decision makers treat these cost measures as if they were variable. Under certain conditions, as this paper demonstrates, decision makers can be led both closer to, as well as further from, economic optimum when fixed cost is unitised and allocated.

While much of the accounting literature on pricing has focused on the dysfunctional aspects of allocation, most firms continue to use absorption costing as a fundamental input in pricing (Govindarajan and Anthony, 1983; Gordon et al, 1981). The persistence of such behaviour suggests positive reasons for its continued use. One possibility, among others, is the nature of the firm's production function. Recent analytical work has examined conditions under which absorption costing more closely represents the underlying cost function facing the firm (Lere, 1986a; Dickhaut and Lere, 1983; Lere, 1982). Specifically, while variable costing may appear to facilitate profit optimisation, this is not always the case. When marginal costs are increasing at a nondecreasing rate, absorption costing better proxies the underlying cost function.

Another possible explanation for the use of absorption costing is the nature of the demand curve for the product in question. The relative price elasticity of a product results in significantly different output levels under different estimates of its marginal cost. For example, a price inelastic

product, facing a downward sloping production cost curve, can be relatively insensitive to an absorption costing system that overstates its marginal cost of production. Conversely, with greater price elasticity, a product facing a downward sloping demand curve with the same production function could be significantly underproduced. In this case, an absorption costing system would prevent the firm from reaching higher volume and consequently a more economically optimal level of production.

The above suggests that both demand elasticity and the nature of the production function may interactively affect the choice and efficacy of a chosen cost reporting system. The purpose of this paper is to extend analytically the work begun by Lere (1986a) and, more importantly, to demonstrate experimentally *ex ante* conditions under which an absorption costing system may be preferable or less preferable to a variable cost reporting system.

Hypothesis development

In order to maximise firm profit, complete and perfect information regarding a product's marginal cost and revenue function is necessary. Typically, a decision maker possesses only limited information with respect to either function. Several studies have analytically demonstrated the possible effects of using absorption versus variable costing in pricing decisions (Lere, 1986; Dickhaut and Lere, 1983; Lere, 1982). The relative merits of these accounting systems were assessed by comparing accounting representations of economic cost relative to complete and perfect information. In particular, Lere (1986a) considered the effect of nonlinear cost increasing at a nondecreasing rate under incomplete information. As average variable cost increases, marginal cost by definition increases at a faster rate. When used as a proxy for in-

creasing marginal cost, average variable cost understates it. Under absorption costing, a predetermined output level is assumed when unitising fixed cost. If this volume is equal to or greater than the output level where average total cost is minimised, the unitised fixed cost added to each unit's average variable cost results in a unit cost representation closer to the underlying marginal cost, partially adjusting for the understatement obtained from the use of average variable cost. That is, absorption cost is superior to variable cost as a proxy of marginal cost if denominator volume is equal to or greater than the average total cost minimising volume.

Lere (1986a) concluded that if output occurred below the average total cost minimising volume, the superiority of absorption relative to average variable cost could not be clearly determined without reference to a specific output level and the underlying marginal cost curve.

Extending Lere's analysis over the range of cost below and to the left of the average total cost minimum point reveals the following. When production is less than the level at which average variable cost is minimised, that is, output occurs in a region of decreasing cost, absorption costing is a poorer proxy of marginal cost than is variable costing. Although average variable cost overstates marginal cost and continues to do so until the decreasing average variable cost reaches its minimum, the addition of a fixed cost component adds to the overstatement. Thus when average variable cost is decreasing, it is a better proxy for marginal cost.

A firm's revenue function typically is also incompletely specified. Firms operating under conditions of imperfect competition recognise that expected demand is inherent in the selection of a volume for absorption cost determination, and that price elasticity affects demand. The problems associated with demand estimation can be difficult and costly. However, firms receive market information from which price and quantity relationships can be computed. If demand is stationary and linear, a marginal revenue function can be inferred from observed price and quantity over two initial periods. This information, in conjunction with an appropriate accounting proxy of marginal cost, can guide a price setter towards optimal output.

Both the degree of demand price elasticity and the relative accuracy of the accounting cost proxy are important determinants of the price setter's eventual proximity to optimal output. As demand elasticity increases, by definition the effect of a price change upon output is magnified. If the relative accuracy of the chosen cost accounting system is itself determined in part by the production function, then resultant under or overproduction errors associated with the chosen cost system will be magnified by the nature of the

demand function. Specifically, under decreasing marginal cost, the greater underproduction associated with absorption costing will increase more, relative to variable costing, as demand elasticity increases. Under increasing marginal cost, the greater overproduction associated with variable costing will also increase more, relative to absorption costing, as demand elasticity increases.

The above discussion is summarised graphically in Figures 1 and 2. Costs increasing beyond the average total cost minimum point are represented in Figure 1. The two marginal revenue functions, MR1 and MR2, equal increasing marginal cost, MC1, at Q^* , the optimal output level. IC1 is an average variable cost function used to proxy marginal cost (Lere, 1986a). Under MR1, optimisation occurs at $Q1$, an output level greater than Q^* . IC2 is the absorption cost function. A constant amount added to IC1 shifts the cost estimate to the left and a new equilibrium point under MR1 is reached, $Q2$, where output is $Q^* < Q2 < Q1$. In other words, overproduction decreases under absorption relative to variable costing.

MR2, the less elastic function, also intersects the two accounting representations of cost, IC1 and IC2, at different output levels. Output again shifts to the left but in different proportions. The magnitude of the shift is a function of the slope of the average revenue curve, the price elasticity of demand. Stated another way, $Q1 - Q2 > Q5 - Q6$ (Figure 1).

Figure 2 shows the relationship among cost functions where average variable cost is decreasing. As in the increasing case, $MR1 = MR2 = MC2$ at

Figure 1
Increasing Costs

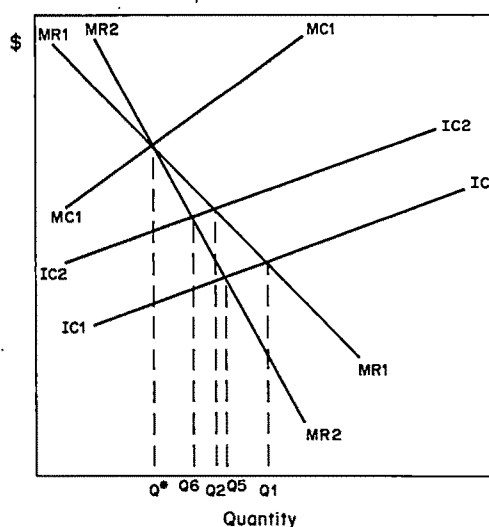
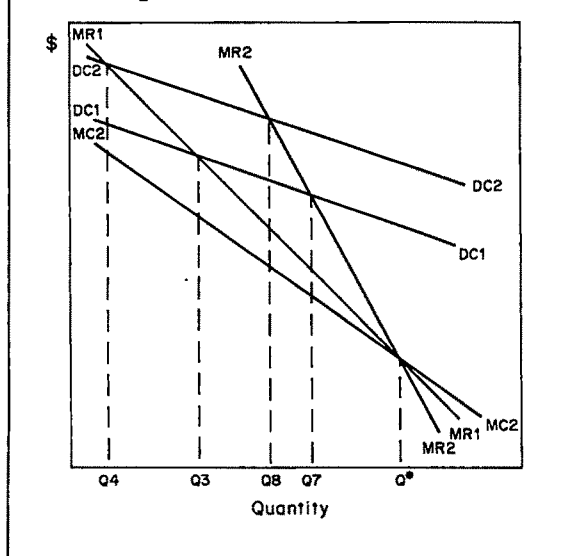


Figure 2
Decreasing Costs



Q^* . Under MR1, when costs are decreasing, the incomplete accounting cost estimates will result in output levels that are less than Q^* , $MR1 = DC1$ at $Q3$. In this instance however, DC2, absorption costing, will lead to a greater level of underproduction than would a variable cost system since $MR1 = DC2$ at $Q4$.

MR2 intersects the two accounting cost proxies, DC1 and DC2, at output levels different from those under MR1. As in the increasing cost case, the decrease in output that results from the fixed cost allocation differs between the marginal revenue functions, MR1 and MR2. The distance between the outputs at $DC1 = MR1$ and $DC2 = MR1$ differs from $DC1 = MR2$ and $DC2 = MR2$ by $Q4 - Q3 > Q8 - Q7$.

Summarising, the relationship between marginal cost and revenue functions and costing systems suggests that various equilibria will result in relative differences from optimal output, Q^* . If output occurs in the region where average total cost is increasing and volume used to determine absorption cost is greater than or equal to the total cost minimising volume, the use of absorption costing will reduce the tendency to overproduce and the magnitude of this reduction will be a function of the price elasticity of demand. That is, when marginal cost increases beyond average total cost, an output shift will be towards Q^* under absorption costing and will be greater if demand is relatively price elastic. If output occurs where average variable cost is decreasing, and denominator volume is less than or equal to the quantity where average variable cost is minimised, the shift will be away from Q^* under absorption costing

and the magnitude of the shift from Q^* will be relatively greater for price elastic goods.

Given the above analysis, an unresolved question is how price setters operating with different production and revenue functions will be influenced by a particular cost reporting system. While attainment of economic equilibrium is not possible under conditions of *ex ante* incomplete and imperfect information, different cost reporting systems can proxy equilibrium better in different circumstances. Given economically equivalent accounting information, research in product pricing suggests that decision making behaviour may vary purely as a result of the format of that information. In other words, the method of cost reporting may itself affect behaviour. For example, Ashton (1976), Swieringa et al (1979), and Dyckman et al (1981) examined the pricing behaviour of subjects asked to set prices under both variable and absorption costing. Their conclusions were essentially consistent. Price setters responded as if they did not sufficiently incorporate differences in the accounting methods of computation.

Critics of the above studies have suggested that subjects may not have adjusted their decisions because they had insufficient information regarding the effect of the accounting differences. To remedy this deficiency, Bloom et al (1984) incorporated full disclosure of an accounting method, accelerated versus straight line depreciation, in a study that required individuals and groups to make pricing decisions based on these two levels of absorption product cost. Although there was some evidence to suggest that individuals attempted to respond to the allocation differences, adjustments were insufficient. Groups adjusted even less than individuals. Most recently, Barnes and Webb (1986), in a field study, used subjects that had undergone an accounting change in their organisation. Given variable versus absorption costing data, subjects again exhibited fixity behaviour.

None of the above studies examined the economic consequences of the suggested fixity behaviour. If price setters maximise absorption accounting income, as may occur under GAAP reporting requirements, regardless of the production and revenue functions of the product in question, economically (sub)optimal outcomes for the firm can result. The same holds true for variable costing.

While fixity research suggests that the format of the cost reporting system influences pricing behaviour, Wilner and Birnberg (1986) argue that these results are equivocal. They raise a number of unanswered methodological issues. In particular, they argue that observed outcomes may be attributable to lack of feedback regarding decision outcomes, absence of a 'correct' criterion measure or, perhaps, simply be due to the inexperience of the subjects themselves. Their analysis suggests

that price setters, given feedback relative to a criterion, may not exhibit any pricing differences solely as a function of the accounting format. Typically, pricing decisions are made *ex ante*, in conjunction with flexible budgets under conditions of imperfect cost and revenue information. Unfortunately, unless the underlying production and revenue functions are known with precision, such economic feedback will be imperfect.

The above results suggest that the consequences of providing informationally imperfect absorption and variable cost accounting information of an unknown production function under different demand elasticities to price setters are important considerations in profit maximisation. Using the analytical framework derived earlier, two questions are addressed in this study. Do subjects differ in their pricing behaviour solely as a function of the cost reporting system? If so, what are the economic consequences of such behaviour? Earlier discussion and analysis suggests that the efficacy of the chosen cost reporting system should be a direct result of the underlying revenue and cost functions. Specifically, it is hypothesised that:

- H1: A price setter's deviation from economic equilibrium will differ under absorption and variable costing and will be jointly affected by the elasticity of demand and marginal cost function. Specifically, under incomplete production cost information and decreasing (increasing) average variable (total) cost, price elasticity will result in decisions with relatively larger (smaller) deviations from economic equilibrium under absorption costing than variable costing.
- H2: Price setters under incomplete production cost information will be closer to economic equilibrium under absorption (variable) costing when marginal and average total (variable) costs are increasing (decreasing).

Methods

Subjects

Fifteen intermediate and advanced cost accounting undergraduates were used as subjects. Having recently been exposed to and tested on variable and absorption costing and their effect on inventory valuation and income determination, they should have been sensitive to the effect of cost reporting differences on pricing.

Experimental Manipulations

Price elasticity was manipulated by providing subjects with an *ex ante* estimated revenue function for the product in question. In one case, the revenue function was relatively more elastic than

the other (MR1 and MR2 in Figures 1 and 2).¹ Subjects were provided a range of existing prices in the market.² The price ranges were symmetric about the equilibrium point—\$25.20 ± \$10.20 (inelastic) and \$18.85 ± \$5.65 (elastic). This yielded an identical range of quantity, $Q^* \pm 55,000$ units, for all treatments.

Two economic cost functions, one increasing, the other decreasing, were created (MC1 and MC2 respectively in Figures 1 and 2).³ These functions were mathematically symmetric. That is, other than sign, their respective slopes were identical at any particular output level. This symmetry permitted subsequent statistical comparisons across cost functions. Because the purpose of the experiment was to examine the effect on pricing behaviour of accounting cost proxies to an *ex ante* unobservable production function, the actual cost functions were not revealed to subjects. The unobservable increasing and decreasing production function manipulation simply consisted of informing subjects that costs were increasing or decreasing as output changed. This was defined to mean that average variable, average total, and marginal costs were all either increasing or decreasing.

An estimated variable cost per unit was derived for each of the economic cost functions, IC1 and DC1 respectively in Figures 1 and 2, at the optimal level of output, Q^* , disclosed as normal volume. This can be thought of as a standard cost or some other predetermined unitised cost estimate that would be provided to a price setter. The total fixed cost was provided in addition to variable cost per unit in the variable costing cases. Under absorption costing, the above variable cost per unit was provided, plus a unitised allocation of the fixed cost (shown as IC2 and DC2 respectively in Figures 1 and 2). The denominator used was again the optimal output level, Q^* . This was also provided and shown as normal volume. In other words, under the two cost reporting system manipu-

¹The total elastic revenue function was $26.560063X - 0.10279375X^2$ from which the elastic marginal revenue function (MR1), $26.560063 - 0.2055875X$, was derived. The inelastic marginal revenue function (MR2), $39.27475 - 0.3751166667X$, was derived from the total inelastic revenue function, $39.27475X - 0.18755833X^2$. The two functions intersected at $Q^* = 75,000$ MR = 11.14.

²This had the desired effect of subjects reaching their equilibrium point within a given decision set of six iterations per case, reducing the extreme pricing behaviour and experimental error detected during pilot testing.

³The total increasing cost function was $\$189 + 0.443X + 0.0709X^2 + 0.000003733X^3$ from which the increasing marginal cost function, MC1, was derived. $MC1 = 0.443 + 0.1418X + 0.0000111X^2$. The total decreasing cost function was $\$189 + 21.8693X - 0.0713X^2 + 0.0000003846X^3$ and the decreasing marginal cost function, MC2, was equal to $21.8693 - 0.1426X + 0.000001154X^2$. The cubic in both equations, although small, introduced a slight curvature to each function. The two cost function intersected at $Q^* = 75,000$, MC = 11.14.

lations, the decision maker had identical, albeit incomplete and imperfect, accounting information. Only the reporting format differed (see Example Cases in Appendix).

The above cost and revenue information enabled subjects either to deduce the point at which marginal revenue equalled accounting variable and absorption cost, or to derive this point through trial and error with feedback provided (to be explained). While attainment of economic equilibrium was not possible with the *ex ante* accounting information provided, if the subject chose to maximise absorption income under decreasing cost, by definition this resulted in greater deviations from economic equilibrium. Conversely, on the increasing side, if the subject chose to maximise variable income, greater deviations from economic equilibrium also resulted. The relative elasticity of the revenue function could further compound or mitigate the decision result.

In summary, three manipulations were tested: elastic-inelastic revenue functions; increasing-decreasing marginal cost functions; and variable-absorption cost reporting systems. Economic equilibrium was the point at which $MR1 = MR2 = MC1 = MC2 = Q^* = 75,000$ units. Departures from economic equilibrium under the variable cost system were symmetric about this point. This was determined to be $Q3 - Q^* = 26,000$ units $= Q1 - Q^*$ in the elastic case, and $Q7 - Q^* = 14,000$ units $= Q5 - Q^*$ in the inelastic case. The addition of a fixed cost per unit shifted all points to the left by 12,000 and 7,000 units respectively in the elastic and inelastic cases.

Experimental task

Each subject was presented with eight cases, representing all combinations of the three experimental treatments previously discussed. Case order was randomised between subjects. They were provided written instructions and given an oral summary of these instructions. They were also given a trial case to familiarise them with the task and feedback.

Each subject was required to set a price based on the information provided in each treatment. All cases, including the trial case, contained a description of the cost condition they were under, contents of the cost, how it was measured, and the result of the measure. The subject's price was entered into a computer from which feedback was received based on the cost and revenue function related to the particular case. The feedback restated the cost system under use and its measure and the total number of units demanded at the subject's current price, total revenue, total accounting cost, and total accounting profit. (See Example Cases in Appendix.) Subjects were again asked to set a price. Demand at the new (or same) price was revealed as was total revenue, total accounting

cost, and accounting profit. For absorption costing cases, the variable and fixed costs were reported separately, enabling the subjects to compute a contribution margin if that was part of their profit maximisation rule. Six pricing iterations took place under each case or treatment, for a total of forty-eight pricing decisions. The subject's goal was to maximise economic profit. This goal was presented to them twice in each case as well as being stated orally. Further, they were instructed that cash compensation for experimental participation would be based upon maximisation of economic profit, i.e., their cash payment would vary as a function of their performance.

To test the hypotheses in question, a 2^3 full factorial repeated measures analysis of variance was used. The use of repeated measures in the fully within subject design required all subjects to evaluate four cases twice. The two sets of four cases were identical except for the variable versus absorption cost format. Subjects had ample opportunity to refer back to the identical economic scenario and observe different outcomes resulting purely from the accounting information formats which were shown to them in writing and on the computer screen.

The dependent variable was deviation from optimal output, $Q - Q^*$, where Q was the number of units (in 000s) sold at the subject's established price. The mean deviations under increasing and decreasing average variable costs were, by design, symmetric above and below Q^* . In testing the significance of differences between the magnitudes of deviations from Q^* , their absolute values were used, eliminating differences resulting solely from sign. The sign of the deviations in any subsequent discussion is simply an indicator of the direction of deviation from Q^* .

Results

The first hypothesis posited that under incomplete and imperfect cost, deviations from economic equilibrium would be jointly affected by the cost function, price elasticity of demand, and reported accounting cost. That is, if marginal cost were decreasing (increasing), price elasticity of demand would lead to a greater (lesser) deviation from Q^* under absorption costing than would variable costing.

Deviations from economic equilibrium were analysed for both the sixth decision and average of all decisions. The early decisions introduced potential noise in each subject's search for his or her optimal output level. Prior research has shown that subjects develop a learning rule over repeated trials in finding an optimal pricing strategy (Day, 1967; Baumol and Quandt, 1964). Given a trial and error profit maximising approach, the initial decision did not have the benefit of any feedback, and the

Table 1
Absolute Mean Deviations from Q*
Sixth Decision (000s)

		<i>Cost Functions</i>			
		<i>Decreasing</i>		<i>Increasing</i>	
		<i>Variable</i>	<i>Absorp</i>	<i>Variable</i>	<i>Absorp</i>
<i>Price</i>	<i>Elastic</i>	(29.0)†	(38.0)	26.8	13.0
<i>Elasticity</i>	<i>Inelastic</i>	(16.9)	(21.1)	12.7	10.1

†Parentheses indicate underproduction relative to Q*.

subsequent one or two decisions were really trials to assess the effect of a change in price on profit as suggested by Day (1967).

Analysis of the final decision showed the predicted interaction between cost reporting system, marginal cost function, and price elasticity of demand to be highly significant ($F = 11.71$; $p < 0.005$). The impact of price elasticity on departures from economic equilibrium can be clearly seen in Table 1. Under decreasing marginal cost, price elasticity led to a larger deviation from Q* under absorption costing than did variable costing, 38.0 and 21.1 versus 29.0 and 16.9 units (in 000s) underproduced respectively. When marginal cost was increasing, price elasticity led, as hypothesised, to smaller deviations from Q* under absorption, 13.0 and 10.1 versus 26.8 and 12.7 units (in 000s) overproduced.

The strength of this interaction can be evaluated by testing these differences over the treatment means for all six decisions. This data is presented in Table 2.

Although the differences in deviations were in the hypothesised direction, they were not statistically significant ($F = 2.05$; $p = 0.175$). A probable explanation for the absence of significance across all decisions was the random variance associated with the early price rounds, as subjects heuristically searched for their optimal output level (Day, 1967).

To understand the role of each factor better, it is useful to look at their effects graphically. Based on the sixth decision, Figure 3 shows that the

variable cost function resulted in essentially symmetric outcomes on either side of Q*. That is, variable costing resulted in statistically equal absolute deviations from Q* under both marginal cost functions. The addition of an identical amount of fixed cost per unit to variable cost had opposite effects on resulting departures from equilibrium. The relative magnitude of the absorption costing effect on deviations from Q* varied systematically with demand elasticity. The more price elastic the demand, the greater the impact of absorption costing.

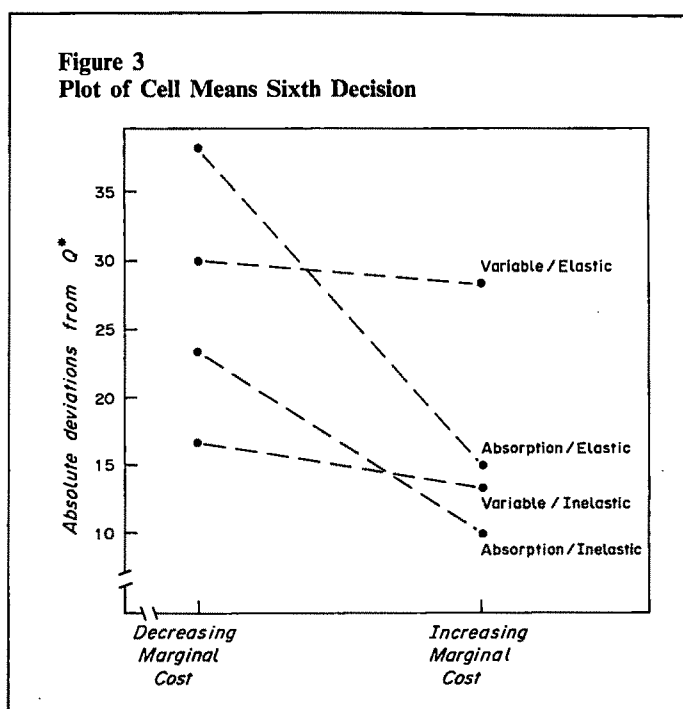
The second hypothesis predicted that departures from equilibrium would be less under absorption (variable) costing when marginal cost was increasing (decreasing). Analysis of the final decision showed the first order interaction between cost reporting system and marginal cost function to be highly significant ($F = 27.23$; $p < 0.001$). Absolute mean deviations are presented in Table 3.

By the sixth decision, in terms of 000s of units, under decreasing costs, the variable cost system resulted in an output level 22.9 units below economic optimum, 6.6 units closer than was achieved under absorption costing. The converse resulted when costs were increasing. The absorption cost departure from economic optimum was 11.5 units above equilibrium, while variable costing resulted in an output level of 8.3 units more than absorption, or 19.8 units above equilibrium. The absolute mean deviations of the outcomes across all six decisions were also analysed. As with the output levels in the sixth decision, absorption costing

Table 2
Absolute Mean Deviations from Q*
All Decisions (000s)

		<i>Cost Functions</i>			
		<i>Decreasing</i>		<i>Increasing</i>	
		<i>Variable</i>	<i>Absorp</i>	<i>Variable</i>	<i>Absorp</i>
<i>Price</i>	<i>Elastic</i>	(25.2)†	(33.7)	24.8	18.8
<i>Elasticity</i>	<i>Inelastic</i>	(18.9)	(22.4)	19.5	14.8

†Parentheses indicate underproduction relative to Q*.



resulted in greater departures from optimality when costs were decreasing, and reduced the deviations when costs were increasing ($F = 31.53$; $p < 0.001$). Together, the data strongly support the hypothesis that price setters, under incomplete marginal cost information using absorption (variable) costing, will be closer to economic equilibrium when costs are increasing (decreasing).

After the experiment, all of the subjects were debriefed to obtain insight on their intent in each of the cases. They were asked to describe how they arrived at their decisions. In general, they stated that their approach was to observe the effect that a change of price had on gross margin. Specifically, the majority of the subjects (9) said they were attempting to maximise gross margin irrespective of the underlying cost functions, with some (3) maximising gross margin or contribution margin, and two maximising profit (one subject did not respond). The subjects stating they followed a rule

other than gross margin maximisation set prices consistent with a gross margin maximising rule. Subjects were also asked how they considered departures from normal volumes in assessing the gross margins. Of the 15 subjects, most (9) ignored any implications, four did not respond, and the remaining two essentially said that they treated fixed cost as if it were variable.

Discussion

This study experimentally examined the economic implications of product pricing under absorption and variable costing with different demand elasticities, given incomplete information about marginal production cost functions. Significant differences in price setting behaviour were noted under variable and absorption costing. Under absorption costing, price setters reduced output, resulting in less overproduction (more under-

Table 3
Absolute Mean Deviations from Q^*
(000s)

		Sixth Decision		All Decisions	
Cost System		Decreasing Cost	Increasing Cost	Decreasing Cost	Increasing Cost
		(22.9)†	19.8	(22.1)	22.2
	Variable				
	Absorption	(29.5)	11.5	(28.1)	16.8

†Parentheses indicate underproduction relative to Q^* .

production) when costs were increasing (decreasing). The magnitude of the reduction in output was a function of both demand elasticity and the (dis)economies of scale in the production function.

The experimental findings are consistent with and extend the analytical outcomes predicted by Lere (1986a). The results also lend additional credence to the fixation hypothesis. Subjects motivated to maximise economic profit did not restate reported accounting profits. Reported profits were maximised regardless of the accounting method used to determine them.

The empirical relevance of absorption costing has frequently been questioned. The above results provide additional insight into circumstances when such a cost reporting system might be beneficial. The experimental findings indicate that absorption costing can lead to more economically optimal price setting than variable costing when used as a proxy of marginal cost if output is equal to or greater than the average total cost minimising volume. Absorption costing superiority in this case is magnified when product demand is relatively elastic. These results suggest that the use of absorption cost in these situations is a rational market response. In cases where variable cost is demonstrated to be the superior alternative, the results suggest that firms should be using variable costing in addition to GAAP required absorption cost reporting. Together, the findings strongly suggest that accountants' reported cost figures significantly affect pricing behaviour. Therefore, how well different cost reporting systems proxy the underlying cost function and interact with demand price elasticity should be a consideration in determining the method of reporting.

The findings are generalisable beyond the particular cost and revenue functions manipulated in the experiment, subject to certain qualifications. If, for example, fixed cost is negligible relative to variable cost, its impact would be immaterial. If fixed cost is material, any increase or decrease in the magnitude of fixed cost simply shifts the point at which average total cost is minimised. As long as output occurs at a point equal to or greater than this point, absorption costing should be the preferred cost system.

The revenue and cost functions were held constant throughout the experiment. That is, uncertainty was not considered. The revenue function can be affected by two sources of uncertainty, a change in price elasticity and a shift in demand. It is generally accepted that uncertain demand follows the principle of increasing uncertainty. (See Leland, 1972 for further discussion.) In sum, the principle holds that as output increases, variance about expected demand increases. Because increased output occurs under variable relative to absorption costing, this would suggest a greater

level of uncertainty associated with its use. This may be another justification for the use of absorption costing.

Another source of uncertainty is the effect of a shift in demand. A demand shift to the right (left) does not change the findings under the increasing (decreasing) cost functions. If demand shifts to the left (right) and costs are increasing (decreasing), the intersection of marginal revenue and cost will occur nearer and perhaps between the average variable and average total minimum points. Once marginal revenue enters this range, absorption (variable) costing remains superior only to a point. Thereafter, variable (absorption) becomes superior. At present, other than analytically, there is not a clear solution to when one system becomes preferable to the other between the two minimum cost points. This area would benefit from future research. Future research should also examine the generalisability of the findings under different utility preferences and uncertainty conditions.

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Appendix

Increasing cost, variable cost per unit reported, and price elastic demand

Example Case I

You are responsible for setting the price of a product with the goal of maximizing economic profit.

The division's cost function is increasing. That is, marginal cost, average variable cost per unit, and average total cost per unit increase as more units are made. Product unit cost is measured on an absorption costing basis. The absorption cost per unit consists of a variable and a fixed component. The overhead. The fixed cost represent fixed factory overhead.

The average estimated variable product cost per unit is

Variable cost/unit	\$5.78
Total fixed costs	\$189,000
Normal volume in units	75,000

The demand function is downward sloping, and relatively elastic. That is, small changes in price result in relatively larger differences in demand. This function is estimated by marketing to be $\$26.56 - 0.103X$. A product of this type usually sells for

$\$18.85 \pm 5.65$ (i.e., \$13.20 to \$24.50)

Once you decide on a price, write it in the space "Price per unit \$_____", which appears on the next page.

After you have determined the price, you will receive the market's response to your price decision. You will be shown the revenue realized at that price and the predetermined variable cost unit times the volume demanded at that price as well as the total fixed cost. You will then have an opportunity to revise your price if you wish to do so. Remember your goal is to maximize economic profit.

Report format used by subjects under variable cost condition:

Price per unit \$_____
Revenue (____ × \$____) \$_____

Less: Variable Cost
of Sales (____ × \$____) _____
Contribution Margin _____
Less Total Fixed Cost _____
Gross Margin _____

Increasing cost, absorption cost per unit reported, and price elastic demand

Example Case II

You are responsible for setting the price of a product with the goal of maximizing economic profit.

The product's cost function is increasing. That is, marginal cost, average variable cost per unit, and average total cost per unit all increase as more units are made. Product unit cost is measured on an absorption costing basis. The absorption cost per unit consists of a variable and a fixed component. The variable product costs are direct material, direct labor, and variable factory overhead. The fixed cost comes from an allocation of fixed factory overhead.

The average estimated absorption product cost per unit is

Variable cost/unit	\$5.78
Fixed cost/unit (based on a normal volume of 75,000 units)	2.52
Absorption cost/unit	\$8.30

The demand function is downward sloping, and relatively elastic. That is, small changes in price result in relatively larger differences in demand. This function is estimated by marketing to be $\$26.56 - 0.103X$. A product of this type usually sells for

$\$18.85 \pm 5.65$ (i.e., \$13.20 to \$24.50)

Once you decide on a price, write it in the space "Price per unit \$_____", which appears on the next page.

After you have determined the price, you will receive the market's response to your price decision. You will be shown the revenue realized at that price and the predetermined costs per unit times the volume demanded at that price. You will then have an opportunity to revise your price if you wish to do so. Remember, your goal is to maximize economic profit.

Report format used by subjects under absorption cost condition:

Price per unit \$_____
Revenue (____ × \$____) \$_____
Less: Absorption Cost
of Sales
Variable (____ × \$____) _____
Fixed (____ × \$____) _____
Gross Margin _____

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Volume 4

Number/numéro 1

Fall/automne 1987

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Book Reviews

Accounting Research—Academic Trends versus Practical Needs. *William T. Baxter.* The Institute of Chartered Accountants of Scotland, 1988. 22 pp. £5.

Professor Baxter has as good a claim as anyone to be the father of academic accounting in the United Kingdom. It is a function of parents to offer encouragement or criticism of their offspring, as appropriate, and this paper finds Professor Baxter in a critical vein. His theme is that there is a gap between academic research and the needs of the practitioner, and that the academic is at least partly to blame. This has been recognised in the USA for at least ten years, notably in the writings of Robert K. Mautz, and, as Professor Baxter relates, the American Accounting Association has tried to bridge the gap with a new journal (edited by Mautz). For the most part, Professor Baxter offers a brief but balanced account of the different perspectives of the academic and the practitioner, including a concise survey of the areas of research which are currently being developed by academics.

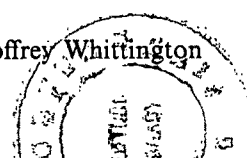
Thus, the pamphlet could be regarded as a simple communication exercise, designed to alert both academics and practitioners to the danger of their moving too far apart. Its only novel features stem from its author's characteristic clarity and wit. Herein lies the danger of the exercise. The clarity is achieved at the price of simplification which sometimes borders on the simplistic and the wit is sometimes so sharp that it cuts rather more deeply than the author perhaps intended, offering some easy jibes to those who are less well informed or well disposed towards academic accounting than is the author. Thus, he paints a view of the motivation of academic researchers which is entertaining as satire but, like all good satire, exaggerates the weaknesses of academics: 'They prefer pure to applied because pure comes more easily, is more fashionable and offers better career prospects' (p. 19). (Why on earth did they become academics at all if they were concerned with career prospects?) Equally, empirical research is portrayed as a remarkably soft option: 'No-one can deny that the resulting tables are fresh knowledge; and they demand only slight ability to write the simple and grammatical. But they may interest and enlighten few readers save specialists' (p. 11). (This would serve equally well as a description of the type of text-book traditionally written for professional examinations, dealing with 'various prac-

tical aspects of an accountant's daily work' (p. 1) with which Professor Baxter feels that researchers should be centrally concerned.)

There are two serious omissions from the pamphlet. Firstly, the substantial practical achievements of academic research are awarded only one brief and grudging paragraph (p. 4). Secondly, there is an emphasis on the need for university departments 'to train students' (p. 1) rather than to educate them. One suspects (and certainly hopes) that if Professor Baxter had drawn more deeply on his own vast experience of accounting practice and education, he would have conceded that practical accountants today know and do many things for which a training in the office or in professional examinations thirty or forty years ago would not have prepared them, yet many accountants trained at that time are still active. They might have learned a great deal which would have been of subsequent value from the university courses which were taught at that time by Professor Baxter and others: certainly the professional examinations of today contain a great deal of material which would have been regarded as academic rather than professional even twenty years ago. Moreover, even if the theories and techniques taught in university courses in the past were not all of subsequent practical relevance, it is to be hoped that a university training in applying critical thought to accounting, unshackled by current professional conventions or the immediate needs of the client, would have provided a better preparation for a career in a changing environment than would exclusive concentration on current techniques, as exemplified in professional training. This is not to say that both approaches do not have their place: they are, in fact, complementary to one another, but the university's comparative advantage must lie in developing critical thought, sometimes of a speculative kind, rather than in polishing and propagating the techniques of current practice. It is probable that Professor Baxter is substantially in sympathy with these views, but this is not apparent from his pamphlet. However, if his message is interpreted as being that the *balance* in research has swung too far in favour of the speculative rather than the practical, this deserves serious consideration. If some of his strictures are painful, this is as much because they contain an element of truth as because some are overstated.

University of Bristol

Geoffrey Whittington



Towards a Theory and Practice of Cash Flow Accounting. Tom Lee. Garland Publishing, 1986. 285 pp. \$30.

The average reader, on opening a book with this title, would probably expect to find a new and fairly comprehensive, up-to-date account of Lee's latest views on the subject of cash flow accounting. This, however, is not the case. The content of this book is mainly a collection of Lee's articles on cash flow accounting arranged mostly in chronological order and tracing the development of his ideas from the early 1970s onwards. As such it will be convenient reference material for students, especially final year undergraduates, wishing to acquaint themselves with this area of the accounting literature, but it is less likely to be of interest to those already familiar with Tom Lee's theories.

There is one fresh contribution. This is the Introduction, which attempts to place the contents of the book in historical perspective and identify the influences on, and the motivation for, Lee's work. Rather disconcertingly, there appears to be no indication, anywhere in the text or on its cover, as to the authorship of the introductory chapter which is written throughout in the third person. Presumably Richard Brief, who edited the work, was responsible for this although it is a style sometimes used by Lee himself. The result of this uncertainty is that the reader is left in doubt as to the status of the views expressed in the introductory summary. Is it a hitherto untold personal reflection on the influences behind Lee's ideas by the man himself or is it an independent learned opinion proffered by a sympathetic spirit?

Nevertheless, the short commencing analysis and the accompanying bibliography does provide a reasonably concise historical framework within which to appreciate the significance of the reprinted articles as contributions to the accounting literature. Clearly, the author of the Introduction believes that cash flow accounting is an example of a 'recycled' problem, i.e. one which has cropped up previously in the history of accounting thought. Therefore, it is suggested, awareness of the evolutionary influences on Lee's ideas may help to prevent the unnecessary recycling of accounting theories and to inform us of their present relevance.

The arrangement of the articles is based on this perception. Twenty six papers are reprinted in all. Following on from Lee's review article of 1981 (in *Essays in British Accounting Research*), his early paper on the topic of goodwill accounting ('Goodwill: An Example of "Will-o-the-Wisp" Accounting', 1971) is used to illustrate how the accounting problem was interpreted initially. Several publications between 1972 and 1974, including 'A Case for Cash Flow Reporting' and 'Enterprise Income: Survival or Decline and Fall', present the main

thrust of the cash flow advocate's attack on the income concept of accruals accounting. This leads in the late 1970s, presumably due to the theories of Thomas (1969, 1974), to the identification of 'allocation' practices as the root cause of the weaknesses in conventional accounting. The paper in *Trends in Managerial and Financial Accounting*, 1978, reflects this belief. The growing influence of Thomas and Sterling and the already strong effect of Chambers on Lee's views then almost inevitably seem to produce his presently held position. This position is expressed in contributions to the literature in 1981 (such as the 'Reporting Cash Flows and Net Realisable Values' articles) and asserts that a combination of cash flow accounting with statements of net realisable values of assets provides both relevant and objective information to the users of accounts in the form of measurements of liquidity 'performance'. Most of the second half of the book, consisting of fifteen articles, goes on to deal with the empirically based work which Lee has carried out in support of his theories—for example, 'A Survey of Accountants' Opinions on Cash Flow Reporting', 1981 and 'A Note on Users and Uses of Cash Flow Information', 1983. Finally two articles deal with some of Lee's responses to criticism. In this regard his retort to Rutherford's observations on the allocation problem (1982) and to Egginton's (1984) viewpoint on performance measurement are reprinted.

The book therefore gives a broad coverage of Lee's work to date. On the one hand there is the *a priori* analysis of the purposes and principles of accounting information. On the other hand there is the desire to present the empirical evidence and the willingness to respond to specific criticism. As a source of authority for the structure of cash flow accounting the disadvantage of collecting old publications together in this way, compared to a freshly written text, is the unavoidable element of repetition of the main arguments as they reappear in successive articles. Lee's work may or may not convince one of the cash flow viewpoint. The message, however, with its strengths and its deficiencies, comes across as clearly as can be expected from theories based upon Lee's type of informal dialectic.

University College Aberystwyth Roger Willett

Personal Financial Markets. R. L. Carter, B. Chiplin and M. K. Lewis. Philip Allan, 1986. viii + 279 pp. £24.50 HBK, £9.95 PBK.

Financial markets have developed rapidly in recent years through a considerable deepening of activities coupled with important advances in communication and data processing technology. In addition, major moves towards deregulation

and competition at both domestic and international levels have led to a broadening of the investment and financial choices available to personal investors.

This book examines the technological, regulatory, and economic reasons for the new competitive environment and explores the implications for financial institutions and their customers, with special reference to the UK and USA. It is usefully comprehensive for it not only deals with the institutions and the markets but attends to the detail associated with the new financial liabilities and assets used. Innovative features and potential for further development are highlighted, especially the widespread use of credit and other plastic cards, automatic telling machines, new cash transfer mechanisms, the use of financial data bases and, finally, the new interest of the stockmarkets, both in the UK and elsewhere, to personal investors.

Chapters 1 and 2 of the book deal, respectively, with the rationale and functions of savings and investment markets, and the special characteristics of personal financial services. Chapter 3 is a particularly useful chapter since it emphasises the new marketing techniques used by financial institutions. It also draws on a number of surveys which have attempted to determine the relative importance of particular characteristics to decision making by personal investors. Chapter 4 looks at the importance of information technology and the early theoretical section provides a useful framework for application later in the chapter. Although a fast moving area, the explanation of recent developments is not as dated as one might fear and there are some useful prognostications. Chapter 5 examines developments in the USA, and chapters 6 and 7 look at banking and deposit services and housing finance and consumer credit services, respectively. Chapter 8, which is concerned with personal investment markets, is already a little dated due to the pace of change. Nevertheless, the chapter provides an excellent description of trends in such intermediaries as unit trusts, investment trusts, life assurance and pensions. However, the publication of the book both precedes the actual deregulation of markets as well as the extraordinary changes in marketing by these institutions. Also, of course, there have been the growth of share options as well as the adoption by private investors of simple portfolio theory in the disposition of funds. Chapter 9 examines the little known and understood area of entrepreneurial finance for small businesses. It is perhaps rather short and does not rest comfortably within the book because of its style and content. Chapter 10 rightly draws together the major strands and for a book written before the financial services legislation was implemented offers a very comprehensive treatment of likely effects and future developments.

The authors of this book of edited readings have fulfilled their intentions as set out in the Preface. The book should be recommended reading for novices in the investment field. Financial markets are no longer isolated and books such as this offer an important source of background information from which wider and deeper perspectives can be drawn and the role of personal financial markets better understood.

University of Exeter

D. C. Stafford

Corporate Social Reporting: Accounting and Accountability. *Rob Gray, Dave Owen and Keith Maunders.* Prentice-Hall International, 1987. xi + 224 pp. £24.95.

Corporate social reporting (CSR) has been an area of interest and contention in accounting and elsewhere for some years. One of the major purposes of this book is to review in a cohesive manner the wide variety of approaches advocated and practised. Another aim is to express support for the notion of CSR and to advocate its development and wider implementation.

While the survey of approaches reflects their own beliefs and preferences, the authors' position is most clearly outlined in the final chapter. Adopting a position between more conservative and more radical stances, their pluralist perspective sees both society and individual organisations as made up of 'stakeholder groups'. They do not view the current structure of society with unqualified admiration, but believe in the desirability of evolutionary, rather than revolutionary, change. The role of CSR is both to reflect the totality of organisational performance, including externalities, and to influence management's motivation towards social performance. Noting the problems inherent in many attempts at CSR, they state a preference for the compliance-with-standards (CWS) approach, discussion of which is divided between the fifth and final chapters.

The authors approach their task via the concept of accountability, which is described in the opening chapter as a duty imposed upon organisations to provide information, not necessarily financial in nature, about the actions for which they are held responsible. Views on the responsibilities of companies, as well as other organisations, differ widely, and a number of schools of thought apparent in the debate are identified, ranging from the 'pristine-capitalists', who deny any duty beyond that of maximising returns to shareholders within the framework of law, to the 'socialists', who wish to see the economic and political dominance of capital broken completely. The introduction of a

simple principal-agent framework does little to resolve or even clarify the issues and may confuse some readers. However, whether or not one wishes to term duties 'contracts', the authors are correct in referring to the difficulty of establishing responsibilities for (a) private sector companies beyond their relationship with shareholders, and (b) nearly all organisations with respect to the environment, labour and the community.

The second and third chapters survey CSR in practice. Developments abroad are examined briefly in chapter 2, which includes overviews of practice in the USA, France, West Germany and Sweden. Emphasising the diversity of aims, target audiences and practices, the material may prove to be a useful addition to courses on comparative international accounting. Developments in the United Kingdom are covered in chapter 3. The authors examine the incidence of a number of particular CSR disclosures, for example to and about employees but, given the paucity of relevant legislation and practice, it is perhaps not surprising that much of the chapter is devoted to a discussion of *The Corporate Report* and the (lack of) reaction to it.

Chapter 4 is unusual in closing with a couple of passages from *The Hitchhiker's Guide to the Galaxy*, recounting Arthur Dent's unhappy experience of the information dissemination policies of the authorities responsible for the building of a hyperspatial express route. This is the only light relief in the chapter which contains a rather ponderous review of accounting theories. The major contributions to the flow of the book are to introduce three constituencies—the local community, employees and consumers—and to state four required characteristics of a social report, viz:

1. It should be accompanied by a full statement of the intended general objectives, at the same time allowing the reader to assess the basis of data selection and the reasons for the form of presentation chosen.
2. Its objective should be to inform society about the extent to which actions for which an organisation is held responsible have been fulfilled.
3. Its choice of data, emphasis, method of presentation and availability should relate directly to the objectives held for the particular groups to which it is directed.
4. It should present audited, unmanipulated data that can be understood by a non-expert making a careful and intelligent reading of the report.

The authors admit that this analysis does not take them very far. They also acknowledge that there appears to be a conflict between the first and second (and other?) characteristics. The second represents their ideal, while the first allows that

some CSR in practice may have different objectives but may still be of some value, particularly if the objectives are stated.

The next three chapters look at three general approaches to CSR: reporting of non-financial information; disclosure of financial information; and externally produced 'social audits'.

In practice, much CSR is non-financial in nature, taking forms such as narrative disclosure, statistical summaries, and social indicators. The quality, including accuracy, of much of what is presently reported is doubted by the authors. They conclude that it has little to do with accountability and seldom comes close to the criteria stated in chapter 4. Presumably the authors do not include in their criticisms the compliance-with-standards (CWS) approach which, though rare in practice and not without theoretical difficulties, is the one they prefer. The basic, debatable idea of CWS is that the law is a 'first approximation' of society's preferences and that the company should report on whether it has met legal standards of behaviour and performance. They mention that standards may also be derived from sources other than the law, though they do not discuss their relationship to social welfare. It is also not clear how well CWS can achieve the characteristics deemed desirable for CSR. Perhaps more discussion of CWS would have been beneficial. Failure to meet standards of information disclosure is an interesting case to contemplate!

Chapter 6 examines approaches which more closely resemble mainstream accounting, with a heavy emphasis on financial quantification. Some of the early attempts to develop comprehensive measures in the form of balance sheets and profit and loss accounts are adjudged to have been a blind alley. They have been either severely incomplete or impractical. However, there may be a role for less ambitious financial analysis, especially when combined with other quantitative and qualitative reporting.

In chapter 7, externally prepared social reports, often known as social audits, are considered. Clearly, these do not constitute a proper discharge of accountability when they are not instigated or supported by the organisation concerned, but the authors suggest that they make a contribution by exerting pressures for 'socially responsible' behaviour. In their shortcomings, they also serve to demonstrate the difficulty of obtaining important information.

The final two main chapters look at issues related to employees. Chapter 8 notes that the publication of an employment report, as envisaged in *The Corporate Report*, has been rare. More sophisticated human asset accounting, which has not been widespread, has tended to develop as a manipulative management tool rather than a vehicle for extending accountability to the work-

force. Much more common has been the 'employee report', which is generally a printed annual statement distributed to all employees. Containing simplified financial summaries of historical information available from other sources, such documents may, at their best, be a useful means of communication and raising awareness, but the authors conclude that they are unlikely to satisfy employee information needs and so do not represent a discharge of accountability. Chapter 9 provides a thorough analysis of the disclosure of information to trade union representatives. Given the possibility of taking action in collective bargaining, meaningful accountability is a real possibility. The union-produced Lucas Aerospace Corporate Plan shows one way of trying to extend the horizons of collective bargaining to deal with issues related to social costs and benefits, but such an approach may require as much reform on the part of unions as of management to be successful.

Finally, chapter 10 sets out the authors' own views on the way in which CSR should develop in the UK. They include some further comments on the compliance-with-standards approach, but they acknowledge that the present economic and political climate is not promising for CSR in general. Some readers, men and women of their time, will not be dismayed at this assessment. Others may see CSR as fundamentally irrelevant to the radical change of society, particularly if the CWS approach, with its inherent orientation towards the status quo, is adopted. Nevertheless the authors are implicitly concerned with power, as not only is its distribution reflected in the production, possession and dissemination of information, but also, they suggest in chapter 9, because true accountability does not exist where there is not the ability to use the information provided—a significant addition to their earlier framework based on accountability solely through information provision. Even supporters of CSR may be unenthusiastic about the CWS approach and may also be concerned about the authors' readiness to shift their focus from society as a whole to the constituencies of the local community, employees and customers.

However, whatever one's personal stance on corporate social reporting, the book should be regarded as a thorough and well-produced attempt to grapple with the subject. It should prove useful to teachers and, with its extensive bibliography, to anyone wishing to begin research in the area. Students should also find it helpful, not only in writing essays and preparing for examinations, but also—so the authors hope—when they are in positions of influence during the next wave of interest in corporate social reporting.

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Strategies, Issues and Events in Industrial Relations: Disclosure of Information in Context. *Jacqueline Jackson-Cox, John McQueeney and John E. M. Thirkell.* Routledge and Kegan Paul, 1987. viii + 216 pp. £25.

The authors have combined their disciplines of accounting, industrial relations and trade union education and training to produce a study concerned with company information as an industrial relations and collective bargaining issue. Based on case studies of thirteen British firms spanning nine industrial sectors, the study aims to analyse the role of corporate information disclosure in management and union industrial relations strategies and to analyse how information is used in industrial relations issues.

The text is divided into five major sections. The first addresses the political context, the second covers concepts and methodology employed, the third and fourth present the case study data that focusses upon industrial relations strategies as well as disclosure and use of information, and finally the fifth provides a conceptual framework that integrates the data from the case studies.

With ample justification the accounting profession is subject to criticism for its limited attention to financial disclosure in the industrial relations context. Hampered by its traditional allegiance to management interests and a dominant company law perspective, it has taken a narrow view of this issue and has largely failed to serve a new and potentially important report user group. The authors' criticism of 1970s texts on reporting to employees, while correct in pointing to their failure to consider the industrial relations context, could however accord more attention and credit to the intended focus of those efforts—the improvement of direct financial communications to each employee as an individual (which some of us argue to be a legitimate communication strategy in addition to union channels).

Chapter 3 provides a very useful overview and classification of models of industrial relations disclosure that have appeared in the accounting and industrial relations literatures. The research methodology employed is presented in Chapter 5. The presentation and discussion is quite well handled but disappointingly brief (4.5 pages). Given the resurgence of interest in case study research in some quarters of the accounting research community, this text represented a prime opportunity to support that trend by a more detailed discussion of the particular focus employed, its advantages and limitations. Case study analysis can be employed to describe a hitherto unknown field, or to explain previously observed phenomena, or to test theories, or, as appears in this case, to develop theory. The role and (cumulative/incremental?) relationship of the cases studies in this text could be

explained in more detail. Nonetheless, this reviewer warmly applauds the authors' adoption of their chosen research strategy.

Chapters 10 through 12 provide detailed results of observed disclosure practices in cases characterised by sole, joint and multiple recognition agreements. Issues and information are considered in terms of wage bargaining and company development. While the authors correctly avoid the temptation to generalise, even in summaries they present results in particularistic style for each company or group of companies. Their *own* form of disclosure is not easily followed.

What of the study's conclusions? The argument of reorienting accounting disclosures from a decision-making to issues-oriented intelligence is useful though not entirely surprising in the industrial relations context. The need for greater disclosure on company development issues (compared with wage bargaining) comes as a fresh insight to this reader, while observations of management's initiating of events and the implementation of strategy through creating events-related structures usefully confirms one's prior (though less well articulated) assumptions.

All things considered, this represents an important contribution to a still regrettably neglected area of accounting research. It provides both detailed grass-roots observations and an accessible framework for disclosure policy analysis and formulation. The researchers, students, and information producers who intend to participate in the study and further development of this field of disclosure must regard this as essential reading.

Flinders University,
South Australia

Lee D. Parker

Developing Control Concepts in the 20th Century.
L. D. Parker. Garland Publishing, 1986, ix + 324 pp. \$30.

Lee Parker's book is one of the latest original additions to the Garland series on Accounting Thought and Practice Through the Years, which now supplement their catalogue of reprints of classic accounting texts. In combination, this compilation of accounting classics and specially written historical surveys provides a rich source of data for the accounting historian.

However, the present volume is more than a survey of the development of management accounting; it seeks to examine how concepts of control have emerged in both the management and the accounting literatures, and to analyse their theoretical content. The topic is covered in two parts, the first considering the period 1900–1959, and the second 1960–1979.

Within each period both the management and the accounting literature are reviewed. In general, the accounting literature is seen as reflecting developments that had taken place earlier in the management literature. The third part of the text is then devoted to a full comparative analysis of the two literature streams, and concludes that accounting has tended to lag developments in management by at least twenty years.

Although I would not dispute the broad line of argument developed in the book, which is an edited version of the author's PhD thesis, it displays distinct unevennesses in treatment. In the first part, a great deal of emphasis is placed on setting the original classical management theorists, particularly Taylor, Fayol and Follett, into their historical context, both social and psychological. In the second part, which reviews the more recent literature, this emphasis on key authors and their historical context is dropped and a more concept oriented approach is adopted. Yet a full conceptual study of the theoretical basis of the study of control in organisations fails to be developed.

The comparative analysis also displays weaknesses. Although it is argued that there has been a neglect of the conceptual aspects of control in accounting, the evidence to support this argument is drawn primarily from accounting texts and the professional literature. Although the academic literature is referred to, the survey undertaken considers only work published in the *Journal of Accounting Research* during the 1970s. Although *JAR* might arguably have been the leading accounting journal during that time, it followed a distinctly idiosyncratic editorial policy. It would have been interesting if the analysis of *JAR* content had been set firmly in its historical context!

I reached the end of the book feeling distinctly dissatisfied. Although development in models of control had been competently and painstakingly surveyed, the book seemed to offer few pointers to the future. In part, this seemed to be due to the restrictions placed on the literature surveyed. Although this included academic management journals, it generally did not include related literature tied more closely to a theoretical base. For example, it did not include organisational theory, sociology or social psychology except insofar as such work crept into management oriented journals. There was also the surprising omission of any reference to Giglioni and Bedeian's (1974) survey 'A Conspectus of Management Control Theory: 1900–1972', published in the *Academy of Management Journal*.

The discussion of control itself also had conceptual weaknesses. I found little reference to planning, despite its close connection with control (however each is defined). Management control was also covered only lightly, despite Anthony's (1965) notable contribution from an accounting

perspective. Neither was my review of these issues helped by the lack of both subject and author indexes.

However, it is perhaps carping to complain that the author did not undertake every aspect of what would amount to a mammoth task. His survey, despite its limitations is thorough and soundly based. It demonstrates the limited vision and lack of theoretical concern of accounting researchers over the period reviewed, and should stimulate us all to make good the deficiencies in our heritage. It is certainly a book I will keep on my bookshelf and refer to frequently.

University of Lancaster

David Otley

Business Accounting. *L. E. Rockley.* William Heinemann, 1987. xii + 340 pp. £9.95.

This book is written for students studying for the AAT and BTEC examinations or pursuing secretarial courses with an accounting component. The author is a well known writer on the practical aspects of capital investment appraisal, local authority accounting, and the uses (and abuses) of financial information for the non-financial accountant. With this background in mind I was very disappointed with the book. My criticisms fall under two headings: the balance of the book, and the technical content.

In relation to the first heading, the chapters covering financial accounting account for about three quarters of the book. Indeed the figure is higher if the final chapter is included: Accounting for Price Level Changes. Costing is covered in twenty four pages and budgeting and planning in twenty seven. Each chapter contains a final section of self examination questions and assignments. My cynical experience with the use of such sections is that although they are a good idea students often ignore them unless the answers are provided, either on the next page or at the back of the book. The chapters on financial accounting cover the usual topics: Sole Trader and Incomplete Records, Partnership Accounts, Ledger Accounts (two chapters), Cash and Funds Flow, the Structure of Final Accounts, and Using Corporate Final Accounts. Double entry is introduced rather unconventionally in the chapter dealing with the Sole Trader and I would have thought it more logical to introduce Ledger Accounts before tackling Partnership Accounts. The three chapters on management accounting obviously cover too much in too short a space in contrast at times to the material in the financial accounting chapters. The unevenness of the book is highlighted in the final chapter which deals with price level accounting in twelve pages, including one on replacement value theory!

In terms of technical content the author offers very little originality. As someone brought up on the traditional bookkeeping texts it was disappointing to see the same approach nearly twenty years on. This is reflected in the author's use of journal entries. Whilst they have a role as a source of certain transactions they are now a minor part of most modern bookkeeping systems. This is also true of the chapter covering Partnership Accounts which is very dated and bears very little resemblance to current accounting practice. The other notable feature of the chapters on financial accounting is that the author appears unaware that the various Companies Acts have now been consolidated in the Companies Act 1985. This must surely confuse the introductory student who consults other texts. I also found the treatment of depreciation less than satisfactory. Surely in this type of book it is not necessary to discuss the sum-of-digits method in any detail. The material in the management accounting chapters is covered very superficially. This is well illustrated by variance analysis to which only four and a half pages are devoted. Another example is in the capital investment appraisal chapter where the cost of capital is introduced like a 'rabbit from a hat'. The other disappointing feature was the index which I felt was very unhelpful to the introductory student. There is, for example, no reference to variance analysis.

In summary, the book will be useful for the audience it is aimed at but it attempts to cover too much material in too short a space.

University of Durham

Raymond Ashton

Security Analysis and Portfolio Management. *D. E. Fischer and R. J. Jordan.* Prentice-Hall International, 4th ed. 1987. xii + 708 pp. £15.95 (Pbk).

This is the fourth edition of a popular US textbook first published in 1975. It reflects both the better and worse aspects of such an enterprise. In its favour it includes up-to-date material and examples as well as references to issues that have recently emerged in the research and professionally oriented journals. To its disadvantage it suffers from inconsistent treatment of related issues, from an ordering of topic discussions that is at times unilluminating, and from a reluctance by the authors to eliminate or radically revise material in their earlier editions.

Its market is clear and well targetted: readers are assumed to know some economics and a little accounting. It is also obvious that the authors are aiming at the increasingly 'academic' needs of potential professional analysts. Thus there is a strong emphasis on doing with little mention of

conceptual difficulties. Consistent with this aim is the incorporation of some case study material: an excellent and entirely appropriate teaching approach for their target readership.

The first of the seven parts of the textbook consists of a brief introduction to securities and the institutional aspects of markets. This section is dated. Although some of the statistics have been updated (to 1984) there is a curious lack of useful or informative data on the volume or value of transactions. There is only a sentence on the development of international capital markets even though later in the book the authors in discussing capital market theory stress the advantages of international diversification.

In Part Two, they discuss some general aspects of risk but confuse readers by introducing systematic and unsystematic risk immediately before measuring risk by the standard deviation of returns. They also introduce, in this section, some complicated formulae for share valuation based on dividend/earnings growth concepts. These formulae are more complicated than those later encountered in the company analysis section of the book. This ordering seems illogical since the aim of the earlier section is stated as being to explore only the notion of security values.

Part Three, however, is a straightforward exposition of the economy-industry-company approach to equity analysis. The treatment of the accounting aspects is cursory with none of the usual discussion of financial ratios: the authors restrict their discussion to some very basic ideas of accounting, such as the matching principle, before listing how financial statements may be useful to the analyst.

The following three parts of the book deal with (a) bond valuation, (b) options and futures and (c) technical analysis and efficient market theory. Of these the first is interesting since it contains a chapter which covers bond portfolio management in an informative but not over-technical style whilst the options and futures chapters include sections on index and other financial futures.

The final part of the book turns to portfolio issues (although, as will be evident above, aspects of portfolio analysis have been introduced earlier). The discussion of portfolio construction (based on Elton & Gruber's analysis) is aimed at the practical, but the coverage of CAPM and the APT seems to have the aim only of assuring readers that these models are of peripheral 'academic' interest. Furthermore, although early in the book the OLS estimation of beta is demonstrated, there is no discussion of how in practice the calculation should be accomplished: no mention of the choice of interval, the number of observations or of the index required. This lack of practical advice seems inconsistent with the needs of the assumed readership. Finally the discussion of portfolio perform-

ance measurement is archaic, relying on a dated exposition of Sharpe, Treynor and Jensen indices without a single reference to the problems identified by Roll.

In conclusion, the book provides a discussion of investment principles which is easier than that available in W. F. Sharpe's *Investments* text and slightly less academic than the equivalent text by J. C. Francis. Whilst it provides a good number of examples which can be used for tutorial and other assignments it does not provide more than a handful of references to which readers may turn in pursuing more advanced discussion of the concepts and issues presented in the text.

University of Stirling

C. W. R. Ward

BASIC Investment Appraisal. R. H. Mole. Butterworth, 1985. 149 pp. £10.25.

This book is one of a series written with the objective of introducing BASIC programming techniques and applying them to specific subject areas. It does not aim at a rigorous treatment of the theory of investment appraisal techniques or of the financial arithmetic underlying them and consequently the reader is required to make 'leaps in the dark' on occasion. Nevertheless, for those who have already encountered the fundamental concepts in an introductory finance course, this book is a readable and understandable primer on BASIC programming solutions to financial calculations. Of course, it is a moot point whether it is necessary or even desirable to teach a high level programming language to business students rather than attempt to instil the same powers of logical thought by using a modelling language or spreadsheet, given that the latter are more likely to be encountered in professional life.

The early chapters of the book are devoted to an introduction to BBC BASIC (chapter 1), a short annotated bibliography (chapter 2) and an introduction to the time value of money (chapter 3). The latter chapter is where the going gets tough for the newcomer to programming and/or finance. A succession of 16 programs is presented, ranging from simple and compound interest to sinking funds, present values and annuities and perpetuities. Each is accompanied by a short introduction to the calculations involved, but in places these are inadequate bearing in mind that the intended readership is not confined to those on specialist finance courses.

Chapter 4 contains programs for various DCF calculations including NPV, IRR, Profitability Index and optimal replacement cycle. Finally in chapter 5, DCF models presented earlier are refined to allow for the impact of inflation, taxes and single period capital rationing on the invest-

ment appraisal decision. However, the refinements attempted are not comprehensive and the resulting models could not be regarded as complete. For example, whilst the effects of taxes on project cash flows are modelled, the relationship between taxes and the cost of capital is not dealt with.

Clearly there is a need for a degree of abstraction in a book of this type and as long as the user is aware of the theoretical gaps and limitations of the models then the learning process encouraged by the book should be worthwhile. Understanding the underlying concepts is necessary to appreciate the limitations and this requires at least an introductory finance course. As a result Mole's book could not be used at the first year level where BASIC programming is often introduced. Its main usefulness would therefore seem to be as a supplementary text in a hands-on, BASIC-oriented course in business finance.

University of Strathclyde

P. F. Pope

Fed Watching and Interest Rate Projections. *David M. Jones.* New York Institute of Finance, 1986. xxi + 200 pp. £13.

As the name suggests this book is a practical guide to US Federal Reserve policy and its influences on interest rates. It explains in clear language the basics of monetary policy and its impact upon economic activity through the rate of growth of money and credit. An explanation is given of the Federal Reserve System and the Federal Open Market Committee, which is the policy-making group, whose assessment of the economic situation influences the policy-makers' decisions on the application of changes to bank reserve pressures in order to exert pressures on interest rates.

The structure of the book is built upon three key questions. First, what does the Fed watch and react to—and why? Second, how does the Fed implement policy? Third, what are the indicators of shifts in Fed policy? On the assumption that central banking is not a science, the author includes in his guide an examination of key personalities, including Marriner Eccles (son of a Scotsman who had come to the US penniless) and Paul Volcker, who is quoted on his economic philosophy that restrained growth of money and credit over the long-run is critical to achieving reasonably stable prices. At the 'Saturday Massacre' on October 6, 1979, Fed policy-makers, following Volcker, decided to discipline money growth from the supply side by controlling reserves rather than from the demand side by controlling the federal funds rate. As the author points out, the policy achieved success in containing inflation and strengthening the US dollar. Although the book

was written before the October 19 crash in 1987, David Jones notes the disturbing effects of US economic policy on exports and the trade deficit.

The style of the author's writing is very user-friendly and provides accessible reading for academics and practitioners interested in the implications of monetarism for expected movements in interest rates.

Plymouth Polytechnic

John Pointon

The Performance of Small Firms. *David Storey, Kevin Keasey, Robert Watson and Pooran Wynnarczyk.* Croom Helm, 1987. iv + 342 pp. £45.

This is an excellent book. Anyone interested in aspects of small firms will find parts of it, according to their purpose, essential reading. The quality of writing and research on small business has not been uniformly high. It is therefore all the more refreshing to discover an extended study which includes both high quality empirical work and authoritative discussion of the small firms literature interwoven in a thought-provoking manner. One of the main conclusions, that 'a small firm is not simply a scaled-down version of a large firm', should be engraved in large letters wherever policy makers make decisions affecting small firms. The ASC, for example, could with benefit have taken this observation as the starting point for their current review of the impact of accounting standards on small companies.

The book is addressed to two principal audiences: policy makers and people who need to predict small firm failure. It takes the form of detailed analysis of a population of small manufacturing companies in Northern England. It is divided into two main parts: 'Profits and Jobs' and 'Failure Prediction'. The authors' careful comparison of their population and findings with other work on small companies to a certain extent overcomes the problem of extrapolating from their population to small manufacturing firms generally. To what extent their results can be generalised to the service sector is an unanswered question.

There is a strong tendency for accountants, even those who have had no professional contact with small firms for many years, to offer *ex cathedra* statements on the sociology and economics of small firms as well as pronouncements about their accounting needs. It may be our system of accounting education which is at fault, since we tend to introduce bookkeeping and financial accounting with stylised examples relating to small firms, well fleshed out with somewhat out-dated *anecdotes*. This being the case, the careful attention which Storey *et al.* give to describing their sample and

relating their findings to previous work carried out in the field is well merited.

The authors show that previous studies of small firms have tended to concentrate on larger members of the population and exhibit a strong survivorship bias. If some of the objectives of assistance to the small firm sector are to be achieved, then more needs to be known about very small firms, short-life firms and the performance of those groups. Even so the authors believe that short-life firms and fast growth firms are under-represented in their population.

Careful scrutiny is given to the annual reports of the population. The composition of the board of directors and shareholdings are analysed together with reporting delays and audit qualifications. A tendency for failing companies to submit their accounts later than average is noted. However, insufficient evidence is provided to support the speculation in the final chapter that ambiguity in the auditors' responsibility to small companies 'may lead some auditors to avoid the type of thorough audit that should be undertaken for fear of losing the account'.

The authors' analysis of the performance of small companies provides an important contrast with that of large companies. There is greater variability of performance from year to year and, probably as a consequence, growth is erratic. In the small sector profitability tends to increase with size, whereas in the large sector the reverse is true. Both high rates of growth and high probability of failure are associated with the presence of 'professional' directors—board members who give 'Company Director' as their occupation and who are likely to hold multiple directorships.

The study of company failure in part two of the book replicates the methods which have been applied to the large company sector. The analysis of ratios and other data is carried out using univariate analysis, multiple discriminant analysis (MDA) and the fashionable factor, logit and probit techniques. If nothing else this constitutes an interesting primer for the researcher intending to tackle similar problems. The results of the analyses are variable. The univariate results emphasise profitability, liquidity and increasing gearing; MDA models select cash flow and asset structure variables; logit analysis selects liquidity and profitability variables but not gearing as significant predictors. But despite its greater sophistication logit has no greater predictive power than the MDA models. The authors' assessment of the predictive power of their models is perhaps greater than is strictly warranted. Although their best model achieves a 76% success rate in classification, it is outperformed by the naive rule of classifying all companies as non-failed. Some assumption about the loss functions of users of the model is required to make it effective. Also consid-

erations of stability of models over time apply equally to small firm models as to large firm models, as the authors point out.

The policy implications of the authors' findings are convincing so far as they relate to manufacturing firms. The present policy of encouraging small business by increasing the profits of all firms in the sector is unlikely to promote employment growth since 'only a small proportion of companies use this increase in profits in full to reinvest in expanding the business', and further 'in terms of job creation, only a few firms matter, and it is those firms which should become the focus of public policy'. As the authors have shown, identifying these firms is difficult but they have made some significant steps in analysis of small firm performance. Perhaps it is time to switch from analysing failure, to researching success—whatever that may mean.

University of Southampton

Michael Page

Accounting and Auditing in the People's Republic of China—A Review of its Practices, Systems, Education and Developments. Shanghai University of Finance and Economics/Center for International Accounting Development, University of Texas at Dallas, 1987. xiv + 226 pp. US\$10.

This volume is a timely and useful aid to the current preoccupation with 'China-watching'. The extent of this interest may perhaps be gauged by the fact that the Sixth International Conference on Accounting Education, held in Kyoto in October 1987, included ten papers on various aspects of accounting and auditing education, research and practice in China. This output, produced by academics from the People's Republic of China (PRC), Hong Kong, Australia and the US, constituted about 15% of the papers presented at the conference. No other individual country had the same level of exposure.

The present study is the result of a joint venture between various faculty members of the Shanghai University of Finance and Economics (SUFE) and Professor A. J. H. Enthoven of the Center for International Accounting Development at the University of Texas at Dallas. Its stated objective is to provide 'an authoritative text on accounting, auditing and taxation with background on the socio-economic, political and historical aspects of Chinese life. . . [looking] at China from a Chinese perspective. . . [while framing] that view in the fabric of Western life' (Foreword, p. vii). Its scope is thus much wider than the title suggests.

The book is in three parts. Part 1 deals with accounting, auditing, tax, investment laws, research and education and training. It also includes a chapter on 'budgetary unit accounting', which

appears to be the process by which the State, provinces, counties and cities formulate and implement the receipt of funds and allocation of resources to enterprises and departments. The section contains a wealth of information: for example, there is a uniform accounting system for both financial and management accounting; historical cost is used almost without exception; costing methods cannot be changed without approval from top-level administration; violation of accounting principles and regulations will result in 'administrative sanctions or criminal prosecution in serious cases' (p. 42); the number of CPAs is to be increased from the current level of about 1,000 to 10,000 by 1990; and a Personal Income Regulation Tax with a base rate of 20% and a top rate of 60% was introduced from January 1, 1987, 'to narrow the income gap among Chinese citizens' (p. 81).

Part 2 contains two rather different but interesting chapters. The first is a summary of the political, social and economic structure of China. This cannot be considered out of context in a country where 'accounting and auditing theories are deeply rooted in the ideological foundation of Marxism-Leninism' (p. 4) and '[t]he basic methodology [of research] is dialectical materialism and historical materialism' (p. 151). The second chapter is a history of accounting and auditing in China, from preliminary accounting in the slave society of the Xia Dynasty (circa 2000-1500 BC) to the present. Part 3 is a summary and comment on all the previous chapters.

It is apparent that this volume is as comprehensive as its joint authors wished it to be. There is something for everyone, from the 'international businessperson' [sic] to the accounting historian. Therein also lie the book's weaknesses. The different chapters are unevenly written, and the final summary does not provide any overview, or larger perspective, of accounting and related systems in the PRC. China's long isolation from the rest of the world is reflected in two ways: the authors are often unable to present their information in the context of similar practices in other countries; and in the wealth of detail which is presented, the reader is unlikely to be able to distinguish important aspects of Chinese practice from less significant ones.

While the book suffers from insufficient analysis and under-editing, there is no doubt that, as the first comprehensive text of its kind, it provides much useful information, and is well worth its cost. However, given the rapidity of changes in the PRC, a second revised edition will no doubt be needed fairly soon.

Nanyang Technological
Institute, Singapore

Joanne Tay

Accounting Control and Organizational Behaviour.
David Otley. Heinemann, 1987. xii + 144 pp. £12.95.

This book seeks to correct the apparent lack of emphasis in current British management accounting textbooks on organisational behaviour (OB) and the problems inherent in the design and use of management accounting systems (MAS). Professor Otley attempts to 'provide both managers and management accountants with a simple guide to the major issues involved in developing and using accounting systems for management control'. The book, it is claimed, can also be of use to academic and professional students of management accounting.

The subjects covered are interesting for several reasons. To begin with, accounting operates within an organisational culture and the inter-relationships between them are particularly important and even crucial to organisational success. In addition, because of the managerial implications of organisational control, accounting control as a special part of it, and responses to such control, are important subjects within the larger issue of corporate information systems.

There are several approaches to analysing such a subject. One might stress economic analysis, focusing on the effects that MAS could and do have in organisational settings, the costs and benefits of these effects and the requisite conditions for effective MAS. One could also examine MAS under the discipline of organisational realism, looking behind formal culture (rules, practices, goals and relationships) for underlying explanations that would help us to understand them. Yet another is the formal institutional and procedural approach which may concentrate primarily on detailed descriptions of available MAS and on accounts of formal negotiations and decision making processes involved in adopting MAS. Otley has decided to follow a highly 'academic' approach, concentrating primarily on 'an attempt to distil the major research findings now available into a compact and readable form'. One major strength of the book is its treatment of motivation and the capital budgeting process. The central concept of motivational theory is offered as 'activation'. This is described as the amount of psychological energy a person has available to deal with a given situation or event. The model suggested (p. 41) is:

$$\text{activation} = \frac{\text{uncertainty}}{\text{outcome}} \times \frac{\text{importance}}{\text{outcome}} \times \frac{\text{ability to}}{\text{influence outcome}}$$

The capital budgeting chapter de-emphasises the appraisal techniques but highlights other stages in the capital budgeting process such as project orig-

ination, authorisation of expenditure, and post-audit investigation.

Otley takes us skilfully and knowledgeably through the ins and outs of the critical literature on the prevailing emphasis by accountants on the mechanical aspects of MAS despite the imprecision of available predictive models of organisational performance. But the book's special interests lie in its brevity and in its bringing out the interplay between MAS and organisational culture.

The book is unevenly structured into three parts. Part One on theory has three chapters which provide, in 38 pages, a quick coverage of the extensive critical literature on accounting for management control, control systems and human behaviour and the roles of budgets in organisational control. The book then turns in Part Two to issues of application. This part has five chapters and discusses in 83 pages how performance can be motivated and measured, the aggregation of accounting information for planning and control purposes and the design and control of operational and capital budgeting systems. Part Three presents the summary and a reluctant 5 page discussion on the very important topic of 'prescriptions for practice'. There are two other important additions: an accounting information systems check list (5 pages) and a guide to further reading (6 pages).

There are problems with the approach taken. Otley's book allows us to understand MAS on one level—the critical level. It is a critique of an accounting practice increasingly given to the primacy of procedures and systems and it permits us to doubt the operational usefulness of extant MAS. He could have provided more prescriptions for practice, i.e. on how such systems which are capable of avoiding the identified and well argued problems can be designed. But this was not to be, the major reasons being (a) that it is not possible to spell out specific recommendations for the accounting information systems designer (p. 62); (b) the fear of the pervasive conflict between what is desirable and what is attainable in the organisation (p. 7); and (c) that not only are we ignorant of optimal methods of attaining desired ends, we are sometimes ignorant even of possible methods (p. 52).

There is very little economic analysis and practically no discussion on how the management accountant can present reports in this discordant setting. The effects of MAS on organisational culture—an important variable in the interaction between MAS and OB—are given very little attention. We are also not introduced to the internal politics and propaganda of the management accountant within the organisation. We are given a few reasons why other organisational role players should be wary about MAS issues, but this is not done sufficiently to allow us to understand the political forces that underlie the interaction be-

tween MAS and OB. The approach thus lacks a level of pedagogic treatment of those issues that would allow the reader to design a more effective MAS or to evaluate its effectiveness. The so called 'check list' towards the end of the text is a collection of objective tests on what has gone before, rather than a check list for evaluating MAS. A check list should contain items or facts which should guide designers when they seek to assess the adequacy or verify the completeness of their MAS. They should be definitive not dialectic.

The book raises a lot of questions but offers no answers. It is doubtful, therefore, if it can serve as a handbook (or an *aide mémoire*) on the major issues involved in developing MAS which take account of OB. However, if the book is viewed in the context of the 'Guide to further reading' (pp. 129–34) as one which does not seek to proliferate issues and ideas well treated in the books so cited and as one that extends the critical literature on MAS not previously organised in a readable form elsewhere, then Otley has rendered a valuable service to both students and lecturers of the subject. The book does not aim at producing a particular theory of OB—either as an independent or dependent variable—but looks at OB from many angles. It is a major synthesis producing a new understanding of the human, behavioural and motivational aspects of MAS.

Finally, I doubt whether practitioners will find much in the book that is of professional help to them although they will find a great deal of wisdom in it. The book belongs, essentially, on the shelf of any academic or professional student interested in management (managerial) accounting. It provides a fine introduction to the impressive body of research on behavioural implications of MAS that has appeared in the past two decades. A number of the chapters, including the bibliography and the guide to further reading, will also have a broader appeal. It is at this level that this book will, I am sure, find a steady market.

University of Exeter

R. S. O. Wallace

The Cash Recovery Rate Approach to the Estimation of Economic Performance. *Andrew W. Stark.* Department of Accounting and Business Method, University of Edinburgh, January 1987. 19 pp. £3.75.

Cash flow accounting has been debated in the academic literature for some time, but it has never received anything like the amount of attention, or implementation in practice, accorded to various forms of accrual accounting. Andrew Stark attributes this to 'the lack of a "tool-box" of interpretative devices to help the user of cash flow

statements', comparable with the ratio analysis which is applied to conventional accrual accounts. His lecture concentrates on one contribution to a new 'tool-box' for cash flow accounts, namely the cash recovery rate. This plays the same central role in the analysis of cash flow accounts which the accounting rate of return plays in the analysis of accrual accounts. Dr Stark interprets that role as being to provide a proxy for the economist's internal rate of return which he regards as the ideal measure of *ex post* economic performance of the firm.

Before presenting his analysis of the cash recovery rate, Dr. Stark discusses the accounting rate of return as a proxy for the internal rate of return (pp. 8-9). His conclusion, that the accounting rate of return (ARR) is correlated with the internal rate of return (IRR) but not perfectly, is unexceptionable, but the balance of the discussion perhaps errs on the side of emphasising the discrepancies between the two rather than their fundamental relationship. In particular, Kay's (1976) extremely elegant analysis of the theoretical relationship between ARR and IRR is ignored completely, as is the later proof of similar results for the discrete case (which, for accountants, is more realistic than the continuous, calculus-based analysis used by Kay) provided by Peasnell (1982). The subsequent extension of Kay's analysis to current cost accounting (using value to the firm as the valuation basis) by Kay and Mayer (1986) is also ignored. Much of this work has been brought together and extended in the recent book by Edwards, Kay and Mayer (1987), which was published after Dr Stark's lecture. It provides a formidable case for the continued development of accrual accounting, if we accept Dr. Stark's position that an *ex post* measure of the economic rate of return is a central concern of accounts. It also draws attention to the importance of regarding the alternative to cash flow as *accrual accounting* rather than, as Dr Stark is inclined to do, *historical cost* accounting. Even conventional published accounts now contain a mixture of historical cost and current values, and reconsideration of the measurement basis of accrual accounts clearly has an important part to play in the development of accounting practice, despite Professor T.A. Lee's disparaging comments (in his Introduction to Dr. Stark's lecture) on 'the arid debate of a current cost alternative to historic cost accounting'.

The bulk of the lecture (pp. 9-16) is devoted to the analysis of the cash recovery rate (CRR) as a proxy for the IRR. The exposition is very clear, although inevitably it relies heavily on reference to other papers, including an unpublished paper by Grinyer and Stark, for evidence and proof. The CRR was, of course, originally proposed by Ijiri, but Dr. Stark's preferred measure is rather different from that of Ijiri, in that it uses gross cash flows and gross assets, which Dr. Stark believes to

produce a CRR measure which is more consistent with the discounted cash flow method of investment appraisal. The assumptions necessary to translate CRR into a measure of IRR are carefully explored. Some of these are, of course, fairly heroic. It is necessary to assume a common cash flow profile for all of the firm's assets, or investment in a constant mix of assets with different cash flow patterns but equal economic lives, so that the past and future cash flows of the firm can be modelled by using the concept of 'the typical firm project' (p. 10). Combining this cash flow profit with knowledge of the amounts and timing of past investments and the current level of cash flows enables us to infer the future cash flows to be derived from present investment, and hence the IRR earned on it. Thus, whereas accrual accounting uses closing asset values as a proxy for the present value of future cash flows, the CRR approach projects future cash flows from knowledge of current cash flows and past investments.

Clearly, these are strong assumptions, and the calculations involved, even in simple cases, are less appealing intuitively than those associated with accrual accounting. Greater simplicity can be bought only at the price of even stronger assumptions, e.g. the assumption that all firms have typical firm projects with level cash flows (p. 14). This produces a CRR which appears to be the inverse of the payback period (although the author does not describe it as such). The payback method has long been accepted as a rough rule of thumb for investment screening, but not as an adequate substitute for a proper discounted cash flow calculation. The reason for this is the unrealistically restricted nature of the assumptions necessary to make the payback method entirely consistent with discounted cash flow, and the same criticism may be levelled at CRR.

Nevertheless, Dr. Stark provides a clear and stimulating account of a line of research which ought to be pursued further. The limitations of the present state of analysis should be regarded as a challenge to be overcome, rather than a reason for going no further, and this pamphlet suggests a number of directions for future work, e.g. our empirical knowledge of the form of cash flow profiles, their stability over time and the extent to which they differ between investments and between firms is, at present, inadequate.

University of Bristol

Geoffrey Whittington

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In the Shadows of Wall Street. Paul Strebel and Steven Carvell. Prentice-Hall, 1988. 144 pp. \$34.95.

Given the number of market anomalies in recent years, it is not surprising that some consideration should be given to the opportunities they present for investors to earn abnormal returns. The authors, Paul Strebel of Lausanne, and Steven Carvell of Cornell University, interpret the anomalies not as 'January', 'Price Earnings ratio', or 'Small Firm' anomalies *per se* but as symptomatic of a single pervasive inefficiency, the persistent failure of neglected stocks to be efficiently priced. The evidence for this theory is presented in Part One of the book.

The writers do not reject the efficient market evidence but argue that it holds only for better-known stocks. The opportunities for superior investment, they argue, are to be found amongst unpopular securities not heavily researched by professional analysts. The choice facing the investor is to adopt a purely passive strategy or to hunt actively in the 'shadows' for mispriced securities.

Although the book appears to argue that neglected stocks are systematically undervalued it does suggest that real investment success involves more than buying a random selection of such stocks: it calls for judicious application of conventional fundamental research techniques to stocks in the shadows, a process which they admit can demand 'the special combination of vision, ability, commitment and patience'.

Part Two focusses on the process of identifying neglected stocks and how to adapt conventional analytical techniques to deciding what is a true discount stock. Part Three deals with the problem of screening eligible stocks before applying the fundamental research needed to identify 'a true shadow portfolio'.

There is little new in the notion that any opportunities for abnormal gain are likely to be found amongst those stocks in which institutional investors have shown little interest. However, the authors' review of the literature relating to small firms' shares was unfortunately published too early to take account of some significant new studies, such as Rogalski and Tinic, *Financial Analysts Journal* (December 1986) which appears to undermine their explanation of the Small Firm effect.

Even accepting the authors' thesis about neglected stocks, two problems remain unanswered

by the book: (a) why under-researched securities should tend to be undervalued rather than randomly mispriced, and (b) if, as they acknowledge, it is so difficult to earn abnormal returns amongst popular stocks, why the publication of their book is not likely immediately to turn the spotlight on to the 'shadows'. It would seem a small price to pay by the professional investment community if the payoffs, as the book suggests, are worthwhile.

Although Part Two includes a summary of the standard principles of fundamental analysis, this is not a textbook and cannot really be recommended for finance and investment courses. On the other hand, it does provide an interesting case study for students, and may be useful to professional investors who would like to draw on the capital market literature without having to subscribe to a purely passive investment strategy.

University of Glasgow

Simon M. Keane

International Conference on Accounting Education, October 14-16, 1982, Monterrey, Mexico. Juan M. Rivera and Konrad W. Kubin (eds). Maria Press, 1987. 100 pp.

As Ol' Blue Eyes sang once upon a time, 'It happened in Monterrey, a long time ago'. Unfortunately, on the evidence of this edited version, it has not improved with age.

After a listing of the organising committee and the participants (pp. 1-9) the five official papers of the conference are reproduced. They are:

- (i) Adolf Enthoven, 'Accounting Education—Its Importance and Requirements' (pp. 11-46).
- (ii) Rodolfo Montemayor and David Noel Ramirez 'Accounting Education at the University' (pp. 47-55).
- (iii) Harvey Mann, 'Education for the Professional Accountant' (pp. 57-66), with a Discussion by Stephen Zeff (pp. 67-71).
- (iv) Konrad Kubin, 'Continuing Professional Education' (pp. 72-93).
- (v) Khuwaja Amjad Saeed, 'Accounting Education at the Graduate Level: Pakistan Experience' (pp. 95-100).

The qualities of the long paper by Enthoven are hinted at by the early statement of aims: 'This address covers: how I see the changing international and regional economic scene, the way accounting should adapt hereto, the impact this has on accounting theory and practice, and the ways and means accounting education (for example, training and research) may have to be "adjusted" to more usefully serve the existing and projected economic-financial demands' (p. 13).

Most *ABR* readers will be familiar with the

caricature of the academic specialist as one who learns more and more about less and less until eventually he or she knows practically everything about next to nothing. This paper goes off in the other direction, and tells us hardly anything about almost everything; though I suppose that in the end it comes to much the same thing. A splendid example is the observation that '... accounting education also could be more uniform by region. Due to local and regional differences, however, a uniform detailed accounting education pattern may not be feasible' (pp. 39-40). We are given a small jewel in the form of a contribution to the dreaded debate on 'ting' versus 'tancy'; footnote 3 (p. 45) tells us solemnly that 'Accounting covers the body of knowledge, the theory, and substance, while accountancy tends to cover the activity or practice. We shall however use the term accounting although in essence we are referring to accountancy'. Who cares? The great achievement of this paper is to render its important general topic almost intolerably turgid.

The half-life of the piece by Montemayor and Ramirez is really rather short. However, the debate between Harvey Mann and Stephen Zeff has a bit more sparkle about it. Mann advocates 'preparing' fewer professional accountants, and establishing 'professional schools of accounting' (or should he

have said accountancy?) to do it. Zeff questions Mann's judgement about numbers, and his solution, by the demoralising technique of raising questions and then saying 'I do not know the answers to these questions, and I have not seen any research on the subject' whilst listing 27 references which he implies his protagonist ought to have read. It is a masterly short illustration of defence in depth, and the use of spoiling and holding tactics; one is left waiting anxiously for the editors to shout 'Break'.

Konrad Kubin's piece on CPE has some useful things in it, although concentrating more on the requirements of regulatory agencies and less on personal career development than some might think appropriate. He concludes with a ten-point framework for action, with the thrust of which it is hard to quarrel. He also offers a bibliography with some 70 references: up to 1982 only, of course. Saeed's piece distils, in four pages of text, the 'experience of 35 years', and whilst frank is perhaps a little short of detail.

It all happened in Monterrey, a long time ago. It would have been good to learn a bit more about the stars and steel guitars, and so forth.

University of Southampton

Michael Bourn

Accounting, Auditing & Accountability

Volume 1 Number 1 1988

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ISSN 0951-3574

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Margate CT9 1NU

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Effects of Personal Characteristics on Materiality Decisions: A Multivariate Analysis

Ralph Estes and D. D. Reames

Abstract—In an effort to contribute to improved audit efficiency and quality, an experiment was administered to 596 CPAs to study the potential effects on materiality judgments of auditors' personal characteristics. A multivariate analysis indicates that age and place of employment can affect materiality decisions, while years of external auditing experience, place of employment, frequency of materiality decisions, and gender may affect confidence in materiality decisions.

As the practice of public accounting has become more competitive, CPAs face greater pressures to reduce fees and increase auditing efficiency. Most efforts toward these goals have focused on auditing procedures.

For a given set of auditing procedures, or within a given audit program, audit efficiency and/or quality can be improved by reducing inconsistency in application of procedures, standards and judgments. For example, when two auditors select different sample sizes for a given task, at least one of them is using too large a sample for efficiency, or too small a sample for sufficient evidence.¹

Inconsistency in materiality judgments will similarly result in a lower level of efficiency or audit quality. Accounting firms, standard setting bodies and researchers have therefore sought to define materiality and to identify its parameters under various conditions.

These efforts, and particularly prior research studies on materiality, have tended to focus on financial statement relationships. This is, however, only one of the sets of factors that can affect materiality judgments. Other potential influencers are personal characteristics of the auditor, current economic conditions, history of the engagement,² and experiences on the current audit (a string of discovered errors, omissions and misstatements would undoubtedly lower an auditor's materiality

threshold). This study addresses one of these sets of factors, the personal characteristics of the auditor.

Personal characteristics can be classified as short term or passing, and as longer term. Short term characteristics might include the current state of the auditor's health, attitude, self-image and relationship with client personnel. Longer term characteristics would include gender, age and experience. This study is restricted to longer term personal characteristics.

A study that focuses on personal characteristics affecting materiality judgments has significant implications for audit partners and managers who supervise and review the work of staff accountants. If the personal characteristics that influence materiality judgments can be identified and related to individual staff members, then action can be taken to lessen or compensate for the differences in judgment among auditors.

For example, if it were established that, *ceteris paribus*, auditors with graduate degrees in accounting are on the average more confident and less cautious than those with a first degree only, training and work review specific to such individuals might be appropriate. Similarly, individual-specific training and/or review might be implemented to compensate for differences associated with other readily identifiable characteristics such as gender, age and amount of experience.

In fact, most firms undoubtedly do compensate, in their training and work review processes, for experience differentials. The issue addressed in this study is whether adjustments might be in order for this as well as for *other* personal characteristics.

The motivation for this study is similar to that for studies that have investigated firm-specific differences in audit opinions. Confidence in the accounting profession is reduced and society is not well served if two accounting firms arrive at

¹Of course it will be difficult and perhaps impossible to determine the *optimum* sample size, but it is still important to recognise that an optimum exists and to strive to reach it.

²When one of the authors was with a Big Eight firm, one audit client was infamous throughout the staff for trying to hide unpaid invoices and thus understate current payables, to improve the current ratio and thereby satisfy the bank that held the company's notes. Our materiality threshold was generally lower on this engagement than on others.

significantly different opinions on the basis of the same set of facts; similarly, the quality and the consistency of audit work is lessened if two individual auditors arrive at different conclusions in the light of the same set of circumstances—*unless allowances are made during the review process for such differences*.

Prior research

Studies by Newton (1977), Hofstede and Hughes (1977), Firth (1979) and Mayper (1982) support the view that materiality judgments and thresholds differ among individuals. Messier (1983) found that the personal characteristic of experience is a factor in materiality judgments. On the other hand, McGhee, Shields and Birnberg (1978) report that personality variables, such as tolerance for ambiguity and decision style, do not account for a significant portion of the variance in behaviour in human information processing. Muldrow and Bayton (1979) found that sex was not an influential factor in the *accuracy* of decisions; however, women executives were conservative when it came to risk.³

These studies suggest that certain personal characteristics affect materiality decisions, but vary in conclusion as to the degree of effect. The present study was therefore designed to investigate simultaneously a combination of personal characteristics that might account for some of the variation in materiality decisions and for differential degrees of confidence in such decisions. Each characteristic is investigated individually while controlling statistically for the effects of the remaining characteristics.

Research methodology

Personal characteristics to be tested were selected on the basis of a review of prior research (Ashton and Kramer, 1980; Hull, 1980; Hendricks, 1976; Elias, 1972). The factors used are years of external and internal auditing experience, semester credit hours in accounting, completion of an auditing course, years of college, whether presently employed in public accounting, frequency of materiality judgments, sex and age.

The several hypotheses tested may be summarised as follows:

Materiality decisions/confidence assessments do not differ significantly for different levels of personal characteristics.

Two small cases were developed that required materiality decisions. One dealt with the probability of uncollectibility of a large account receivable due from a single customer (this receivable was equal to 33% of current assets, 10% of total assets, and 33% of net income). Subjects were provided with summary financial information about the reporting company and asked to determine what the probability of uncollectibility would have to be in order for the situation to be considered material and therefore require adjustment of the financial statements or qualification of the audit opinion. Subjects then indicated their confidence in that decision, on a scale of 0 to 10 (with 10 representing complete confidence, and 0 identified as no confidence at all).

The second case involved a disagreement between management and the auditors. The auditor believes a batch of inventory is obsolete, but management refuses to make an adjustment to write down inventory. Subjects were asked what the amount of obsolete inventory would have to be for them to qualify their opinion, and to again indicate their confidence in their decision.

Experimental research packets were mailed to a nationwide random sample of 1,406 CPAs; 460 responded to the first mailing and 136 on second request, for a total response rate of 42%. Descriptive statistics on all variables are presented in Table 1.

Possible non-response bias was investigated by performing a t-test on the earliest and latest 20% of responses received, for all variables. Oppenheim (1966) observes that 'it has been found that respondents who send in their questionnaire very late are roughly similar to non-respondents'. Thus if later responses differ significantly from earlier ones, the non-respondents may similarly differ from those who did not respond, and non-response bias may be present. No significant differences ($\alpha = 0.05$) were discovered between early and late responses on any of the variables. Non-response bias does not therefore appear to be a problem.

Data were subjected to multiple regression analysis in order to (1) control statistically for variation in personal characteristics; (2) obtain, through regression coefficients, an estimate of the effect of each independent variable on each dependent variable; (3) provide an estimate of the probability (the significance level) that the indicated relationship is due to chance.

Assumptions required for the use of multiple regression were carefully investigated, with particular attention given to possible collinearity among the independent variables. When two or more independent variables are strongly correlated, the coefficient estimates of these variables can be unreliable. Kaplan (1982) suggests that this is a problem when the correlation is 0.90 or above,

³Other studies on materiality, not specifically relevant to the present study, include those concerned with decision models (Crosby *et al*, 1987; Cushing *et al*, 1979; Moriarity and Barron, 1976); external factors that may affect the materiality decision (Ward, 1976); and those that have investigated materiality thresholds associated with financial statement variables (such as Abdel-khalik, 1977; Boatsman and Robertson, 1974).

Table 1
Response Statistics

	Mean	Std. dev.
<i>Dependent variables:</i>		
Accounts receivable: probability of uncollectibility	43.843	45.820
Confidence in receivable decision	7.320	4.357
Inventory: amount obsolete	6760.286	4422.348
Confidence in inventory decision	7.327	1.736
<i>Independent variables:</i>		
Years of experience in external auditing (with public accounting firm)	7.313	7.800
Years of experience in internal auditing	1.338	4.092
College credits in accounting	32.522	11.617
Course in auditing?		
Yes	98%	
No	2%	
Years of college work	4.747	1.263
Place of employment:		
Public accounting firm	46%	
Other	54%	
Frequency of materiality judgments (frequently = 1; occasionally = 2; rarely = 3; never = 4)	1.798	0.968
Sex:		
Male	91%	
Female	9%	
Age	38.682	10.554

while Emory (1985) would go as low as 0.80. An analysis of correlation coefficients for all possible pairs of independent variables revealed no correlations that were even close to being large enough to constitute a danger by these criteria.

Results

Regression coefficients for each combination of dependent and independent variable, along with probabilities of significance, are presented in Table 2. For the ensuing discussion a significance level of 0.10 will be used as a cut-off for inclusion of a variable in the discussion. Results are discussed in terms of the following broad factors: experience, education, place of employment, frequency of materiality decisions, and the inherent personal characteristics of gender and age.

Experience

Consistent with *a priori* expectations, experience in external auditing with a public accounting firm significantly increases confidence in materiality decisions. It does not, however, have a significant effect on the decision itself, and experience as an internal auditor affects neither the materiality decision nor confidence in that decision.

These results suggest that, *when other factors are equal*, the materiality decisions of beginning staff

and more senior audit personnel in a public accounting firm will not differ significantly, although they may reflect different degrees of confidence in those decisions. Put another way, this study provides support for relying on the materiality decisions of newer audit staff. Skill in making materiality decisions is apparently learned more in academic study than in on the job experience.

Education

Three variables were used to control for and identify the differential effects of education on materiality decisions and decision confidence. None of these—college credits in accounting, years of college, whether an auditing course had been taken—significantly affects the materiality decision or confidence in that decision.

This result may raise a question as to whether academic accounting programmes provide students with sufficient instruction and practice in making materiality decisions. It may, however, merely reflect the sample selection which produced a homogeneity of educational background. By sampling only CPAs we would expect most subjects to have at least four years of college (97% did), a good number of credit hours in accounting (91% had 21 or more; while 64% had taken at least 30 hours), and a course in auditing (98% had taken such a course). The effect of educational factors on

Table 2
Regression Coefficients
 (Significance Levels in Brackets)

<i>Independent Variable</i>	<i>Dependent Variables</i>			
	<i>Receivables</i>		<i>Inventory</i>	
	Decision	Confidence	Decision	Confidence
Years of external audit experience	-0.0755 (0.826)	0.0473 (0.015)	23.2599 (0.480)	0.0278 (0.028)
Years of internal audit experience	0.3561 (0.488)	0.0054 (0.911)	-13.5349 (0.783)	-0.0076 (0.689)
College credits in accounting	-0.0601 (0.722)	-0.0166 (0.299)	20.1959 (0.212)	0.0073 (0.240)
Course in auditing?	-4.6559 (0.720)	0.5665 (0.645)	242.2403 (0.845)	-0.3106 (0.517)
Years of college work	*	-0.4653 (0.674)	241.1480 (0.829)	-0.3078 (0.476)
Place of employment (1 = public accounting, 2 = other)	-8.2043 (0.071)	1.0649 (0.013)	219.8722 (0.611)	0.2317 (0.164)
Frequency of materiality decisions (1 = frequently, 2 = occasionally, 3 = rarely, 4 = never)	-1.6830 (0.460)	-0.3239 (0.133)	-95.7991 (0.662)	-0.2349 (0.005)
Sex (0 = female, 1 = male)	3.0496 (0.664)	-1.1292 (0.089)	900.9301 (0.182)	0.6672 (0.010)
Age	-0.1241 (0.615)	-0.0116 (0.620)	-60.5275 (0.011)	-0.0012 (0.891)

*Variable did not enter the equation.

materiality decisions and confidence might have been quite different if our sample had included more persons with limited or no prior academic work in accounting, or fewer college graduates.

Place of Employment

Employment in public accounting appears to raise one's threshold for acceptance of the likelihood of non-collectibility of large receivables. Recall (from Table 1) that participants in this study would, on the average, qualify their adult opinion when the probability of receivable non-collectibility in the hypothetical case exceeded approximately 44%. The negative regression coefficient for place of employment, in relation to the receivables decision, indicates that persons in public accounting would accept roughly an 8% higher probability of non-collectibility before qualifying their audit opinion. (Responses on this variable were coded 1 for public accounting and 2 for all other; as the value of the variable goes up from 1 to 2, the negative coefficient means that the estimate of the acceptable probability of non-collectibility goes down.) On the other hand, public accountants were not as confident in their receivables materiality decisions. This can be viewed

as consistent, since the public accountants' acceptance of greater uncertainty as to collectibility is accompanied by less security about that decision.

Place of employment was not significantly associated with the inventory materiality decision or with confidence in that decision. It is possible that the differences in the case structures resulted in different decision processes influenced in a different way by personal characteristics, and these in turn produced feelings of confidence influenced by a different set of factors.

Frequency of Materiality Decisions

Participants were asked how often their current responsibilities required them to make judgments concerning the materiality of amounts to be reported in financial statements: frequently, occasionally, rarely or never. These responses were coded 1, 2, 3 and 4 respectively, and were treated as an interval variable. (This is obviously an ordinal and not an interval variable. Parametric statistics should be used on ordinal data with caution, although Anderson (1961, p. 309) takes a strong position that they may be used without qualm.)

After holding all other characteristics constant, materiality decision frequency was not significantly related to either of the materiality decisions; it was associated with an increase in participants' confidence in their inventory materiality decisions, while the effect on confidence in the receivables decision was nearly significant at the 10% level (a 13% probability that the coefficient was so small as to be due to chance, or an 87% probability that it was not due to chance).

Gender and Age

Materiality decisions do not differ significantly by gender; if a man and a woman have about the same levels of experience and education, work in the same field, are involved in materiality decisions to the same degree, and are the same age, their materiality decisions should not differ solely on the basis of sex. This result obviously supports the growing integration of women into the accounting profession.

Confidence is another matter, with the results inconsistent on this issue. Women were more confident in their receivables materiality decisions but less confident in their decisions on inventory materiality. This inconsistency is difficult to explain, and may simply be due to random error. On the other hand, the different results may be related to the analytical processes required in the different cases presented. The receivables decision required an answer expressed as a percentage of non-collectibility, while the inventory decision required an answer in dollars. If, for example, men and women are differentially comfortable in working with percentages (and this can only be speculated), this could account for a different level of confidence in the two decisions. This may suggest a need for a behavioural research study outside the field of accounting.

Older participants were, other things being equal, inclined to require an opinion qualification for a lower level of obsolete inventory; each year of age reduced the materiality threshold, on average, by approximately \$60 (compared to a mean value of \$6,760). No significant effects were attributable to age.

Summary and interpretation

The experiment reported on here studied the effects of personal characteristics on auditor materiality decisions and confidence in those decisions. Participants were provided with limited financial information about a hypothetical company and required to make two materiality decisions, and also to express, on a scale of 0 to 10, their confidence in each of those decisions. Multiple regression analysis was used to assess the effects of each personal characteristic.

Experience in external auditing (but not in internal auditing) was found to increase significantly the auditor's confidence in materiality decisions. Educational factors, including a course in auditing, were not significantly related to the materiality decisions or to confidence in those decisions; this result may raise questions about the adequacy of academic attention to materiality decisions, or it may merely be due to educational homogeneity among the study participants.

Current employment in public accounting appears to raise the CPA's materiality threshold with respect to the possible non-collectibility of receivables, but consequently results in less confidence in that decision (compared to the CPA not in public accounting). On the other hand, CPAs who frequently make materiality decisions appear to be more confident.

Differences in materiality decisions between males and females, holding other factors constant, are not great enough to conclude that they are not due to chance. This finding suggests that gender is not a factor in audit ability or audit quality. Finally, older CPAs appear to be more conservative, at least with respect to qualifying an audit opinion for obsolete inventory.

Of the nine personal characteristics studied, only two (age and employment in public accounting) produced significant differences on materiality decisions. This should be reassuring to the accounting profession, since wide variation in materiality judgments by auditors with different personal characteristics could produce varying and inconsistent audit opinions, or pressures on clients to record adjustments or change presentations, in otherwise identical circumstances.

Personal characteristics exert a somewhat greater influence on decision confidence; years of external audit experience, employment in public accounting, frequency of materiality decisions and gender may significantly affect one's confidence in a materiality decision, even when the decision itself is not affected by any of these factors.

We may ask whether differential decision confidence is of any concern to the accounting profession, as long as the decisions themselves are not affected. Confidence in an auditing context has not been widely studied, but is surely related to the overall opinion formation process. Several decisions to accept financial statement errors as immaterial, accompanied by a low level of auditor confidence in each decision, could accumulate to a lack of confidence in the overall fairness of financial statements. This is a fertile area for further research.

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A Longitudinal Study of the Readability of the Chairman's Narratives in the Corporate Reports of a UK Company*

M. J. Jones

Abstract—This paper outlines an investigation of the readability of the chairman's narratives, as determined by the Flesch score, of a limited company's corporate reports from 1952-1985. It supports earlier studies which demonstrated that corporate reports were difficult to read, and had become more difficult to read over time. Turnover and readability were significantly negatively correlated. There also seemed to be a decrease in readability associated with the firm becoming a public limited company.

Introduction

The communication of accounting information to external users is of fundamental importance to published accounting reports (e.g., AAA, 1966, p. 1; ASSC, 1975, p. 28; Steele, 1983). Recognition of this has led some accounting researchers to investigate alternative methods of communication for the annual report, such as Pictics (Smith and Taffler, 1984; Moriarty, 1979), videos (Gambling and Beattie, 1986) and the employee report (Maunders, 1981-83; Hussey, 1983; Hilton, 1978). Other accounting researchers (e.g., Pashalian and Crissy, 1952; and Lewis, Parker, Pound and Sutcliffe, 1986) have used readability as a measure of the effectiveness of written corporate communication.

The purpose of the present study is to evaluate the readability of one firm's corporate reports. It uses the Flesch score, a readability technique. The two main research objectives were to determine:

- (1) whether the readability of the chairman's narratives have changed over time, and
- (2) whether any of five factors—financial performance, turnover, different chairmen, change in legal form, change in the title of the chairman's narrative—have been key influences on readability.

The first section examines the relationship between understandability and readability. The next section reviews 13 previous readability studies, and

examines in particular the level of difficulty of the readability of corporate reports from 1948 to 1984. The third section examines some limitations of the previous research, while section four develops seven hypotheses to test both the level of difficulty of the readability of one firm over time, and also some factors which might have influenced readability. Section five outlines the reasons why the Flesch Index was chosen for this study; section six looks at the sampling methodology chosen. The next section looks at some of the limitations of the Flesch Index, and also critically examines the case study approach. Sections eight and nine present the results of the paper, and show which factors appear to have influenced readability. The paper concludes with a summary and implications section.

The importance of readability

Ease of understanding is generally reckoned to be one of the most important characteristics of effective reporting (e.g., ASSC, 1975, p. 28; Carsberg, Hope and Scapens, 1974; AICPA, 1973; Regazzi, 1974). Effectiveness is viewed as the transmission of the desired message to the intended user in an accurate and understandable way (Estes, 1982, Ch 3; Smith and Smith, 1971). A message which is not understood is useless either for decision-making or for monitoring the stewardship function (Smith and Taffler, 1984). A 'semantic' or 'technical' communication breakdown will have occurred (Haried, 1972, 1973). These breakdowns are very common (Lee and Tweedie, 1975, 1976, 1977, 1981).

The terms readable and understandable are generally viewed as being very closely connected (e.g., Smith and Smith, 1971, p. 554; Chall, 1958, p. 7;

*I should like to thank all the many lecturers and staff associated with Portsmouth Polytechnic who helped me, but in particular Dr Steve Hand and Professor Trevor Gambling. This paper has benefited from comments of participants at the September 1986 SWAG Conference, two anonymous referees, and Professor Tony Hope. I also owe a debt of appreciation to H. P. Bulmer Holdings PLC who kindly allowed me access to their archive material.

Flesch, 1948, p. 2). Indeed some researchers (e.g., Adelberg, 1983) have gone so far as to treat them as synonymous.

Review of literature

The fundamental premise that readability reflects understandability has underpinned at least 13 readability studies into financial communication since 1948 (Pashalian and Crissy, 1952; Soper and Dolphin, 1964; Smith and Smith, 1971; Still, 1972; Dolphin and Wagley, 1977; Healey, 1977; Stead, 1977; Adelberg, 1979; Pound, 1980, 1981; Parker, 1982; Lewis, Parker, Pound and Sutcliffe, 1986; Courtis, 1986). All 13 studies used readability tests with 11 based on Flesch's method.¹

Generally, these studies concluded that corporate reporting was couched in an academic, scientific style which the unsophisticated reader would find difficult, or very difficult, to read. Circa 1950, it was estimated that only 4.5% of American citizens had attained an educational level sufficient to read the very difficult material (see Table 1). 33% had attained the difficult level. Since then the average years of education received has increased (see Tables 35–40, OECD, 1974), thus presumably raising educational attainment. However, any consequent improvement in user understanding may be offset by the evidence available, albeit limited, which suggests a decline in readability over the period. Three American studies (Pashalian and Crissy, 1952; Soper and Dolphin, 1964; and Dolphin and Wagley, 1977) tested as far as possible corporate results from the same firms in 1948, 1961 and 1977. They discovered a sharp decline in the corporate report readability.² Lewis *et al.* (1986) over a four year period found that readability did not improve, and that the Flesch index suggested a slight increase in the difficulty of the language used.

Limitations of the previous research

These four studies were the only ones which investigated the trend of readability of corporate reports over time, and even they have major weaknesses. The three American studies tested only three out of 26 years. Lewis *et al.* in 1986 examined only four years and concentrated on employee, not shareholder, reports. No study has investigated a particular company over a long period.

Table 1 Analysis of reading ease scores of chairman's narratives of H. P. Bulmer Holdings PLC 1952–1985				
Reading ease score	Description of style	Typical magazine	Number of chairman's narratives in each category	% of chairman's narratives in each category
0–30	Very difficult	Scientific	0	0
30–50	Difficult	Academic	20	62
50–60	Fairly Difficult	Quality	9	28
60–70	Standard	Digests	3	10
70–80	Fairly Easy	Slick Fiction	0	0
80–90	Easy	Pulp Fiction	0	0
90–100	Very Easy	Comics	0	0
			32	100
				4.5
				33
				54
				83
				88
				91
				93

Source: (adapted) R. Flesch, 'A New Readability Index', *Journal of Applied Psychology*, 1948, p. 230, and *The Art of Readable Writing*, New York, 1949, Harper & Bros.

¹Ten used the conventional Flesch test, and one used the Farr-Jenkins Paterson test, a simplified, but still highly reliable Flesch test (England, Thomas and Paterson, 1953; Farr, Jenkins and Paterson, 1951).

²Their mean Flesch score fell from 31 to 29 to 16 indicating a decline in readability from difficult to very difficult (see below for an explanation of the Flesch score).

The previous research also neglected the United Kingdom. Only one of the thirteen studies was British: there were six American, four Australian, one New Zealand and one Canadian. The different legal and economic situations in these countries may impair the applicability of their findings to the UK.

Development of hypotheses

A longitudinal study of the readability of the chairman's reports of a UK company would overcome some of these weaknesses. The chairman's report was chosen because several studies (e.g., Lee and Tweedie, 1976; Courtis, 1986) have shown that it is the most widely read, and best understood, part of the corporate report. It is also the main section of the annual report written in continuous narrative, and therefore is well suited for readability testing.

H. P. Bulmer Holdings PLC, a medium sized company,³ was selected for the research because it is essentially a well established, one product firm whose business profile has remained largely the same throughout the period. Bulmers kindly allowed access to archive material, which included a set of corporate reports containing a section signed by the Chairman, dating back to 1952. By analysing these reports, more evidence would be provided to substantiate the previous tentative findings on the trend of readability over time, as set out below.

Hypothesis 1—The annual corporate reports have been difficult or very difficult to read over the last thirty years.

Hypothesis 2—The readability of the annual corporate reports has declined over the last thirty years.

A study of one firm over time would also allow a previously unexplored research topic to be investigated—factors affecting the readability of corporate reports. Previous research into tangential areas of financial communication, a background study of Bulmers, and logic were used to select factors for testing.

In several studies (Singhvi and Desai, 1971; Adelberg, 1979; and Morton, 1974) there seemed to be a significant positive relationship between a firm's financial performance and the level of difficulty of its disclosures. Perhaps management consciously or unconsciously put over poorer results in a more difficult writing style. Accordingly Hypotheses 3A and 3B were developed.

Hypothesis 3—The level of readability of the chairman's narratives was positively correlated with the firm's financial performance as measured by

(A) net profit to sales

(B) return on capital employed.

The growth of the firm, as measured by turnover, might also have an important influence upon readability. As a firm grows in size, it becomes more complex, and this may be reflected in its accounts, which will become more sophisticated and difficult to read. Thus:

Hypothesis 4—The level of readability of the chairman's narratives was negatively correlated with turnover.

The identity of the chairman himself might also influence readability. The chairman's narrative is essentially a review for the shareholders of the year's corporate performance. This part of the report is generally the most unstandardised, and is unaudited. At Bulmers the last two chairmen put the flesh on a preliminary draft prepared by the managing and finance directors. This might well have given them a chance to express their own individuality, through their writing style. Thus:

Hypothesis 5—The level of readability of the chairman's narratives was different under different chairmen.

A major change in the users of the corporate report might also be important. In Bulmers this occurred in December 1970 when the firm gained full stock market quotation. Would a significant alteration in the style and orientation of the chairman's message result? Might it become more complex because of the wider audience, or would there be an effort to put across a simpler message? Thus:

Hypothesis 6—The level of readability of the chairman's narratives was affected by a significant change in the form of the company.

The final factor considered is specific to Bulmers. Before 1966 the chairman's review of the company's business year was incorporated in the directors' report, there being no chairman's report. After 1966 the chairman's review was moved to the chairman's report, the directors' report becoming more factual and legalistic. The material in the directors' report before 1966 seemed directly comparable to that in the chairman's report after 1966. Because the material was substantially the same throughout, no significant difference between the two sets of chairman's narratives was anticipated. It was, however, thought prudent to test this.

³In the year ended April 1985 it had a turnover of £62.8 million, an operating profit before tax of £14.1 million, and the average number of employees was 1,936.

Hypothesis 7—The level of readability of the chairman's narratives was significantly affected by the change in title from directors' report to chairman's report.

Choice of readability formula

The major accepted methods of analysing readability use test readers or readability formulas. Test readers were rejected since not only is the process laborious, but they often disagree on their rankings of comprehensibility (Klare 1975, p. 44; Duffy and Kubance, 1982). Readability formulas provide an easy, objective and reliable alternative. However, there is a multitude of such formulas. For example, Klare (1974) ascertained that by 1960 there were at least 30 formulas plus variations in existence. Nor has the invention of new formulas halted (Adelberg, 1983).

The merits of the various formulas were carefully evaluated and the revised Flesch Index (Flesch, 1984) was found most suitable for this study. This was because of its reliability, validity and practicability (e.g., Chall, 1958, pp. 162–164; Klare, 1974). Its frequency of prior use also facilitated inter-study comparison.

Most readability formulas are based upon syntactic complexity and features of words such as syllables (Griesinger, 1984). The Flesch score itself uses a combination of sentence length and syllable count. It is expressed as

$$206.835 - ((L \times 1.015) + (S \times 0.846))$$

where L is the sentence length, and S is the mean syllables per 100 words. The lower the score the more difficult the passage. Once the score has been computed, it is compared with a predetermined table (see Table 1), which gives a description of its readability.

Flesch originally devised his test, using 363 passages out of McCall Crabs 'Standard test lessons in reading', to help evaluate elementary reading abilities. However, research has shown that the formula is valid for adult material; for example, Swanson and Fox (1953) showed that readability indices could predict differences in comprehension between different versions of employee newspapers. A correlation has been demonstrated between student comprehension and the Flesch formula of 0.94 (Pichert and Elam, 1985). It is now widely used to test adult materials.

Sampling methodology

The sampling methodology used followed the steps and grammatical guidelines laid out by Flesch in his original paper (1948). Two 100 word samples were taken from each chairman's narrative since 1952 except for 1952, 1953 and 1965. In 1952 and

1953 the length of the chairman's narrative allowed only one passage of narrative, non-technical English to be selected.⁴ The 1965 directors' report was in an abridged, atypical format and was omitted completely to prevent bias.

As far as possible the samples were taken from the same place from each report. A syllable count and sentence length computation were then done for each. The results of each passage were double checked by the original researcher, and then samples were verified by an external checker. There was 99% agreement.

Limitations of this study

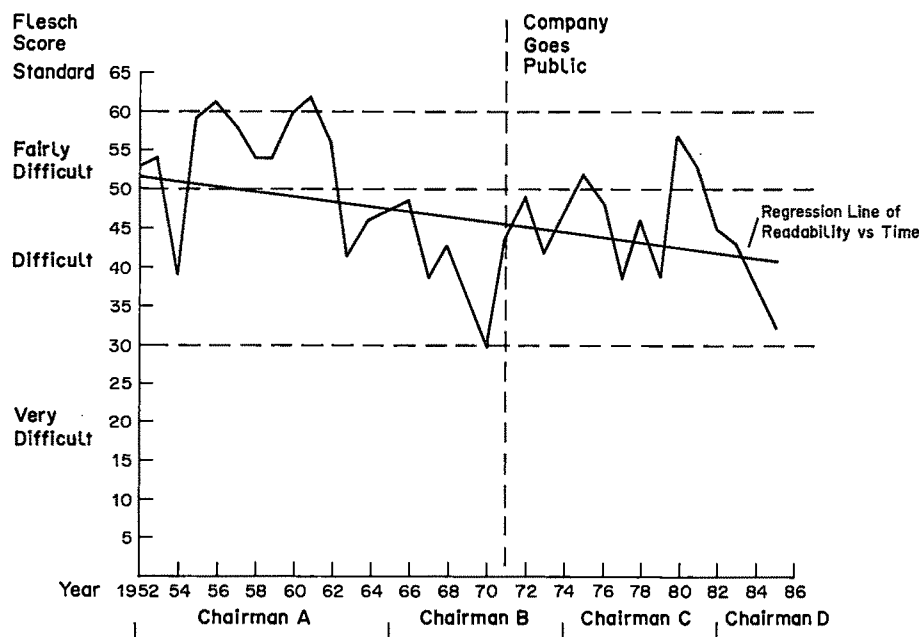
When looking at the results (see Tables 1 and 2), it is important to bear in mind the limitations of the Flesch index and of the one-firm longitudinal study. The Flesch index is concerned only with syntactical complexity and word features. Non-writing style features such as the content, the background of the reader or the format of the report are not quantified (Render, Stair, Steans, Villere, 1976; Courtis, 1986). This is particularly important with corporate reports as more attention is increasingly being paid to presentational aspects such as layout, diagrams and photographs (Haggie, 1984). At the moment, though, there is no recognised method of assessing their impact upon readability. One of the advantages of the chairman's section of the report is that these presentational considerations are minimised.

There have been calls for more emphasis upon understanding accounting in the context in which it operates (e.g., Hopwood, 1983). In particular, use of the longitudinal study (e.g., Kaplan, 1986; Tricker, 1978) and the case study (e.g., Kaplan, 1983), have been advocated. This paper adopts both techniques. It has been argued that longitudinal studies allow a deeper study of the variables than cross-section research (Babbie, 1973, p. 37; Kaplan, 1986). Indeed Wail and Williams (1970) maintain that temporal studies are the only ones which can give a true picture of cause and effect over time. Case studies have been promoted as providing 'a firmer basis for our modelling theory-building and hypothesis formation activities' (Kaplan, 1986, p. 445); as enhancing our understanding of specific, real-life situations (Yin, 1985, p. 14); and as offering insights into accounting practice (Rickwood, Coates and Stacy, 1987).

However it is also important to consider the most important criticism of case studies. Do they have external validity, and in particular are the findings generalisable? (Adams and Schvaneveldt, 1985). As Yin states (1985, p. 39), no one case, or

⁴When these years were excluded completely the results were the same in nature, but of less statistical significance because of the smaller sample size.

Table 2



set of cases, will deal with this problem. Indeed for any one case some findings will be generalisable, and others will not (Tomkins and Groves, 1983, p. 370; Yin, 1985, p. 40). The benefit of the Bulmers case study is its possible insights into the nature of readability, and into the factors that may influence it.

Black and Champion (1976, p. 92) state that it is only through the accumulation of findings from other studies of this sort that statements can be generated that have little or no exception. It is therefore hoped that this research, by beginning an investigation into temporal aspects of readability and of possible influences upon that readability, will start this process. However, its findings like those of any case study cannot be expected to be universally applicable.

Results

Table 1 shows that of the 32 chairman's narratives, 20 were difficult to read, 9 fairly difficult and 3 of standard difficulty. The mean was 47.2 (difficult) with the distribution spread being from 62.1 (standard) to 30.2 (difficult). The standard deviation was 8.6.

Hypothesis 1 is therefore partially supported—these annual corporate reports were difficult to read over the last thirty years. Only about half the population would be educated to a level where they could read them (Table 1). This study does not, however, support the view that corporate readability was very difficult. Indeed, this series of

corporate reports seems easier to read than the prior research suggested.

The relationship between readability and time, as expressed by Hypothesis 2, was tested using simple linear regression. This showed a correlation coefficient of -0.433 which (using a two-tailed test with 30 degrees of freedom) is significant at the 5% level. This implies a significant downward trend in readability over the years (see Table 2 for the regression coefficient).

Statistical analysis of the results

The possible explanatory variables which might affect the independent variable of readability were examined in two stages. Firstly, each causal variable was tested on a direct one-to-one comparison with readability, using the established techniques of simple linear regression (e.g., Freund and Williams, 1977; Moroney, 1965), or Student 't' two-sample independent tests (e.g., Taylor and Dunning, 1977). Then a Multiple Regression computer package was run.

Turnover, return on capital employed and the net profit ratio were tested using simple linear regression (see Table 3). The results obtained failed to support Hypotheses 3A and 3B that readability was positively correlated to financial performance. Indeed, a negative correlation, significant at the 10% level, was discovered for the return on capital employed (Hypothesis 3B).

As Table 3 shows, Hypothesis 4, that turnover was negatively correlated with readability, was

Table 3
Summary of the results of simple linear regression
on the correlation between independent variables
and the readability of the chairman's narratives
of H. P. Bulmer Holdings PLC 1952-1985

<i>Independent variable</i>	<i>r value</i>	<i>Tail test</i>	<i>Significance level (30 degrees freedom)</i>	
			0.10	0.05
Turnover	-0.385**	2	0.296	0.349
Return on capital employed	-0.300*	2	0.296	0.349
Net profit/ sales ratio	-0.218	2	0.296	0.349

*Significance at the 0.10 level.
 **Significance at the 0.05 level.

Table 4
Summary of results of student 't' tests on the
effect of the non-quantitative independent
variables upon the readability of the chairman's
narratives of H. P. Bulmer Holdings PLC 1952-1985

<i>Variable Examined</i>	<i>Degree of Freedom</i>	<i>Result</i>	<i>Tail</i>	<i>Significance 0.10</i>	<i>Level 0.05</i>
Change in title	30	3.04**	2	1.697	2.042
Change of status Chairmen	30	2.39**	2	1.697	2.042
A and B	18	2.77**	2	1.734	2.101
A and C	19	1.25	2	1.729	2.093
A and D	15	2.84**	2	1.753	2.131
B and C	13	1.66	2	1.771	2.160
B and D	9	0.71	2	1.833	2.262
C and D	10	2.21*	2	1.812	2.228

*Significance at the 0.10 level.
 **Significance at the 0.05 level.

supported at the 5% level, (i.e., as Bulmers grew its corporate readability decreased).

The three qualitative variables (change of status, change of title of the chairman's narratives and change of chairman) were tested using an independent two-sample test.⁵ The results are outlined in Table 4.

Both Hypotheses 6 and 7 were supported at the 5% level. The chairman's narratives of Bulmers as a listed company were significantly harder to read than when the company was unlisted. The change in title of the chairman's narrative (1966) also

seemed to make the reports significantly more difficult to read. However, when other years between 1966 and 1970 were student 't' tested they also demonstrated significant relationships with readability. There was thus a discernible increase in difficulty in the period from 1966-70 not attributable to any one year in particular. It probably represents a tightening up of financial reporting before the company went public in December 1970.

The statistical evidence relating to the impact of different chairmen upon readability was inconclusive (see Table 4). Of the six comparisons, two are significant at the 5% level, and three at the 10% level. Chairman A appears significantly easier to read than B or D. However, three out of the six comparisons are not significant.

Simple statistical tests thus supported Hypotheses 2, 4, 6 and 7, did not support Hypotheses 3A and 3B and were inconclusive on Hypothesis 5.

⁵Because of the small sample sizes involved, student 't' distribution was used. An analysis of variances, which supported the validity of using the 't' tests, was performed first (Taylor and Dunning, 1977). Simple linear regression was used to confirm the results and determine the direction of any differences.

Overall the results showed a general trend of negative correlation between readability and the independent variables tested, especially turnover and time. As the profitability performance indicators were also positively correlated with both turnover and time the firm seems to have expanded and become more complex and efficient. This more complex business environment has been reflected in the increased difficulty of the corporate reports.

In an attempt to eliminate intercorrelations between the independent variables and to provide further statistical evidence, multiple regression analysis was carried out (Wonnacott and Wonnacott, 1981; Cohen and Cohen, 1975; Hebden, 1981; Chatterjee, 1977). There were seven independent variables (time, operating profit/sales, return on capital employed, turnover, legal status, title of chairman's narrative, chairman) with readability as the dependent variable.

Unfortunately due to severe problems of multicollinearity, identified by a correlation matrix, it proved impossible to obtain reliable individual regression coefficients. The small sample size also impeded the chances of obtaining statistically significant results. These technical problems meant that the multiple regression model did not give added support to the simple statistical tests.

Summary and implications

This research has examined the readability of the chairman's narratives of a UK company from 1952 to 1985. Its main aims were to throw further light on the trend of readability over time, and to explore any possible factors affecting that readability.

Previous research, which had implied that corporate reports had remained difficult to read throughout the period, was supported. This present paper also demonstrated that in the particular firm studied readability had declined significantly from 1952–1985.

Possible explanatory variables which might have contributed to this decline were tested using simple statistical techniques. Overall there were clear correlations between readability and some of the variables tested, especially turnover and time (i.e., as turnover increased, as time passed, so readability declined). This is consistent with the view that the company's corporate reporting became more complex, reflecting its business environment, and the sophistication of its user groups. There was also a significant decline in readability, before and after the period 1966–70, which seemed to be associated with the firm becoming a listed company.

This research has investigated for the first time readability over time in a particular firm. As such it is an exploratory study and its findings may or may not be generalisable to other firms. The insight

that it gives into the nature of, and influences upon readability within one particular firm will, it is hoped, prompt further research into other firms. This will enable a clear picture of the trend of readability over time and of factors influencing readability to be established.

Finally, the results of this paper may perhaps encourage more attention to the problems of effective communication. Throughout the recent past, the accounting profession has concentrated upon comparability and uniformity (e.g., Bird, 1984) aiming to 'narrow the areas of difference and variety in accounting practice' (ICAEW, 1969). At the same time this study suggests that the readability of the corporate report has deteriorated. If a serious communication breakdown between the providers and users of accounting information is therefore not to occur, standardisation must be accompanied by more understandable, readable accounts. If this does not happen, and corporate reports remain largely unreadable, they will remain largely unread.

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Quarterly Journal of the American Accounting Association

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ACCOUNTING AND FINANCE is published twice yearly in May and November by the Accounting Association of Australia and New Zealand. The membership fee is \$25 per year and members receive the journal and any published supplement. Non members, i.e. libraries etc., can take out a subscription for the journal for \$25 per year. Editorial correspondence should be addressed to Professor F. J. Finn, Editor, Department of Commerce, University of Queensland, St. Lucia, Queensland, 4067, Australia. Applications for membership should be addressed to the A.A.A.N.Z., c/- Department of Commerce, University of Queensland, St. Lucia, Queensland, 4067.

ISSN: 0810-5391

The Impact of the UK Price Codes on Accounting Functions in Organisations: A Power Perspective*

Rifaat Ahmed Abdel Karim

Abstract—The literature on pricing has hardly used the concepts of organisation theory to emphasise the internal factors that seem to influence the *mechanics* of pricing decisions. It is this missing theme to which this article attempts to draw attention by arguing that pricing decisions are influenced by organisational subunits' power which is not necessarily constant over time. This was made possible by examining the impact of the Price Commission, which operated in the UK between 1973 and 1979, on companies' pricing decision making processes.

Introduction

The operation of the Price Codes in the UK between 1973 and 1979 provided a superb opportunity to study how the role and status of accountants in pricing decisions vary according to external factors. In particular, it is argued that, while pricing decisions will be influenced by external market factors, the *mechanism* by which prices are settled will be influenced by organisational subunits' power which will not necessarily be constant over time but will vary with the changes in the environment that are relevant to pricing decisions. The paper is more concerned with improving understanding of pricing *processes* rather than how specific price levels are established (for similar studies of pricing processes see Pearce, 1956; Hague, 1971; Skinner, 1970; and Sizer, 1961, 1976). Hence, the changes which took place in the economy during the Price Codes and their relationships to organisation pricing decisions are beyond the scope of the paper. Rather, the emphasis is on how the different *requirements* of the Price Codes seem to have affected subunits' power over pricing decisions.

The research involves the development of a case study of one of the largest companies in the UK so that a rich understanding of the impact of the Price Commission (PC) (the official body that administered the Price Codes introduced by the government) on companies' pricing practices can be gained and more specific hypotheses be derived.

The research hypotheses, which were tested in nine companies, indicate that the Price Codes were

the dominant external factors that influenced pricing practices and not the state of the market competition encountered by each of the companies in our sample. Furthermore, it was found that accounting departments dominated pricing decisions during the era of the PC.

It is worth pointing out that contingency theory underpins this type of research, and its limitations should therefore be appreciated (Burrell and Morgan, 1979; Otley, 1980; Cooper, 1981). This is fully acknowledged; the effects on pricing processes of major changes like the introduction, modification, and abolition of the Price Codes must take into account the specific contingencies faced by each firm in considering its pricing practices. This research was grounded in descriptions of individual practices from which some general features emerged. Fully justified criticisms of using *naïve* contingency methodological approaches to research should not prevent us reorganising and building more general contingency theory, where appropriate, if it emerges from detailed situational enquiry. A contingency *framework* can therefore be most useful in framing an enquiry provided the detailed methodology is sophisticated enough to identify the extent to which contingency relationships come into play in varying situations, i.e. whether a contingency factor like the introduction of a Price Code is 'brute enough' (see Tomkins, 1984) to allow a fairly direct effect across many situations or is not 'brute enough' to prevent other situational factors from modifying its effects.

The remainder of this paper is organised into five sections. The first section gives a brief background to the two Price Codes. In the second section, the literature on intra-organisational power is reviewed. In the third section, the case study is presented as well as the hypotheses that were derived. Section four discusses some aspects

*The author thanks Cyril Tomkins for his encouragement and help at various stages, and Anthony Hopwood and two anonymous reviewers for subsequent critical insightful comments.

of the research methodology, and in section five the findings and conclusions of the research are presented.

The Price Commission

The Price Codes were introduced by the UK government in 1973 in an attempt to curb the increasing rate of inflation. The 1973–77 Price Code advocated that large firms could only increase prices in proportion to increases in certain allowable costs per unit of product. Such increases were allowable provided that they did not increase the average of profit margins in the best two years out of the five years up to April 1973. All proposed price increases had to be notified 28 days before implementation.

The 1977–79 Price Code abolished the rigid system of price control based on allowable costs and permitted a newly constituted Commission to carry out investigations into proposed price increases to determine their reasonableness according to statutory criteria. If an investigation was conducted and the increases were not justified, prices could be frozen for up to 12 months.

The intra-organisational power literature

Power is an elusive concept. Dahl's definition is probably the most frequently quoted: 'A has power over B to the extent that he can get B to do something that B would otherwise not do' (1957, pp. 202–3). For Dahl, power is only meaningful after a careful examination of a number of observable decisions. Lukes (1974) terms this process the 'one-dimensional view' of power since it involves a 'focus on *behaviour* in the making of *decisions* on *issues* over which there is overt *conflict* of (subjective) *interests*' (1974, p. 15; emphasis in original). A number of writers (for example, Porter *et al.*, 1981; Zaleznik, 1970; Salancik and Pfeffer, 1977) have followed this line of thought by studying the appropriate behaviours required at the individual and group levels so as to attain specific objectives.

Bachrach and Baratz (1970) do not share Dahl's (1957) views. They argue that power is frequently exercised through 'non-decisions' to *prevent* issues coming to the public forum for consideration, and to limit the scope of debate to issues innocuous to those in power. Lukes terms this approach a 'two-dimensional view' of power since it 'allows for considerations of the ways in which *decisions* are prevented from being taken on *potential issues* over which there is observable *conflict* of (subjective) *interests*' (Lukes, 1974, p. 20; emphasis in original). Hence, unlike Dahl's views, the approach advocated by Bachrach and Baratz emphasises an examination of both decision-making and non-decision-making processes.

Lukes argues that the two-dimensional view of

power is itself inadequate and as an alternative offers a 'three-dimensional view' which argues that key actors and institutional practices are instrumental in developing social agendas, commonly known as norms. While most people are aware of the norms that influence their own and others' behaviour in the work place, others are not aware of the future potential issues that may have an impact on their interest (see, for example, Mitroff and Emshoff, 1979).

However, useful though the writings of people such as Lukes are, for greater subtleties and complexities of power one must turn to the empirical studies of writers such as Crozier (1964) and Pettigrew (1973). Furthermore, while Lukes' approach seems to require a longitudinal study using participant observation, interviewing is also useful in assessing power in organisations (see Perrow, 1970; Hinings *et al.*, 1974; Pfeffer and Salancik, 1974). Consequently, this research was focused at the 'one-dimensional view' level. It will be seen that this, nevertheless, helps in understanding the effects on pricing processes of environmental factors like the PC and what impact they may have on accounting functions in organisations.

One distinctive approach to the study of power in organisational settings deals with the subject mainly at the level of departments. This is known as intra-organisational or horizontal power: see, for example, Crozier (1964), Pettigrew (1973), Perrow (1970), Hickson *et al.* (1971), Salancik and Pfeffer (1974), Bariff and Galbraith (1978), Waterhouse and Tiessen (1978), Lukes (1974). This paper is concerned with inter-departmental power, as it endeavours to examine the extent to which there was a shift of power over pricing decisions from marketing to accounting departments during the era of the PC.

The study of power from the perspective of the division of labour is focused on subunits. There are certain conditions under which power becomes more important in organisational decision making. According to Pfeffer (1981), power follows from situations in which there is conflict between subunits. There are three conditions that produce conflict. These are interdependence among organisational subunits, scarcity of resources, and heterogeneous goals and beliefs about technology. However, the use of power depends upon two other conditions. These are the importance of the decision issue or the resource and the distribution of power.

In attempting to achieve their own ends, some subunits have more power and some have less. In this respect, Emerson (1962) emphasises the critical role of dependence in creating power. Dependence is viewed as a function of the importance of what organisational actors do in the organisation. Pfeffer and Salancik (1978) add to the condition of dependence, the skill of the organisational actor in

controlling the allocation and use of the resources upon which the other subunit depends.

However, the pattern of power among subunits differs from one organisation to another, and as Hickson and McCullough (1980, p. 37) have observed,

research has not yet established whether there is sufficient stability and uniformity to enable generalization as to which are the most powerful in which organizations in what circumstances.

For example, in their study of five breweries and two cardboard container factories, Hinings *et al.* (1974) found that production was consistently more powerful than marketing, engineering or accounting because of the special skills required for those industries as well as the involvement of production in all aspects of the organisational process. On other hand, Crozier (1964) found that the maintenance or engineering personnel were more powerful because they have the know-how necessary to repair machine breakdowns. In Perrow's (1970) study the sales department was found to be the most powerful unit.

The power differences in the above studies and similar ones can be attributed to a subunit being in control of resources critical to the organisation, or the ability of a subunit to cope with critical organisational uncertainties. Regarding the resource dependence perspective, Salancik and Pfeffer (1974, p. 70) have argued that:

Subunit power accrues to those departments that are most instrumental in bringing in or providing resources which are highly valued by the total organization.

These resources include control of information (Mechanic, 1962; Pettigrew, 1972), expertise (Pettigrew, 1973) or anything valued by others that they cannot get elsewhere (Kipnis, 1976). For example, Landsberger (1961) argued, from the study of three organisations, that when financial resources are scarce, accounting is more powerful; when raw materials are in short supply, purchasing is more powerful; and, when demand is insatiable, sales are less powerful.

The uncertainty-coping perspective of power has been developed by Hickson *et al.* (1971). In an attempt to develop a theory that provides an explanation as to why there are differences in power between subunits, why one has more and another less, and why there is a shifting distribution of power, Hickson *et al.* (1971, pp. 224-5) offer a 'strategic contingencies theory of power' which argues that:

Those subunits most able to cope with the organization's critical problems and uncertainties acquire power. In its simplest form, the strategic contingencies theory implies that when an organization faces a number of lawsuits that

threaten its existence, the legal department will gain power and influence over organizational decisions.

Coping with uncertainty means that an organisational unit 'is able to deal with some issue of concern to the organization' (Hall, 1982, p. 147), or has 'the ability to solve critical organizational problems' (Pfeffer, 1981, p. 113).¹ However, coping with uncertainty is not adequate to yield power. The strategic contingencies theory argues that this should be enhanced by at least two other factors: non-substitutability and centrality. The former refers to a unit's uniqueness. If skills or expertise are important and are difficult to replace, the subunit that possesses those skills gains power. Centrality refers to the inter-connectedness of a subunit. This means that the more subunits of an organisation that depend on a certain department, the more powerful that department will be.

In summary, the theory argues that a subunit will be most powerful if it (1) copes effectively with high uncertainty, (2) cannot be easily replaced, and (3) is functionally interconnected with most subunits in the organisations. The strategic contingencies theory was tested directly by Hinings *et al.* (1974) and is consistent with the observations of Crozier (1964).

Pfeffer (1981, p. 115) has argued that both the resource dependence and strategic contingencies perspectives take a rather static view of determination of power and resulting decision outcomes. Both perspectives fail to take into consideration that:

Decisions are made in a sequential process, and... [therefore] choices can be affected if the social actor can affect the decision premises, ... can control the alternatives considered in the choice process, or can impact the information about each of the alternatives that is used in making the decision.

Thus, following the strategic contingencies theory, this research attempted to investigate how the introduction of the PC brought about a shift of power over pricing decisions from marketing to accounting departments. This included the study of the process by which pricing decisions were made and how that process changed during the eras before, during, and after the abolition of the PC.

The Price Commission and Interdepartmental Power

The requirements of the 1973-77 Price Code to relate price increases to increases in those costs which were allowable appear to have created severe

¹See March and Simon (1958), Cyert and March (1963), and Perrow (1970) for uncertainty absorption as a source of power.

problems of investments in working capital, in liquidity, and in profitability (Sizer, 1976).² Accounting departments possessed both the information and expertise to cope with such a critical contingency. On the one hand, accounting departments provided the costing information required by the Code for the justification of any price increases. Moreover, after the processing of several applications to the PC, they seem to have developed the necessary expertise of dealing with its various requirements. On the other hand, accounting departments had the know-how to contribute to the solving of the working capital, liquidity, and profitability problems (Sizer, 1981). Such a situation appears to have led to 'a much larger input from the financial as opposed to marketing side of management' in pricing decisions (Evely, 1976, p. 58). Indeed, Skinner (1976) argues that the PC (1973-77) allowed the accountants to exercise more influence on price and to make the running in such decisions.

Thus, it seems that by possessing the necessary information and expertise required by the PC, accounting departments became more involved with marketing departments in pricing decisions. However, despite such interdependence between the two departments it appears that the approaches of both departments tended to be inconsistent with each other. For example, while marketing departments would tend to emphasise the role of the market in determining what prices should be charged, accounting departments would opt for the use of accounting information. Hence, given the importance of pricing decisions during the life of the PC, together with the conditions of interdependence between the two types of departments, their heterogeneous approaches to pricing decisions, and the scarce information and expertise needed to handle the requirements of the PC, appear to have brought accounting departments into conflict with marketing departments over pricing decisions. Such a setting for decision making reflects a situation where power is used for making a choice. Indeed:

In situations of conflict, power is the mechanism, the currency by which the conflict gets resolved. Social power almost inevitably accompanies conditions of conflict, for power is the way by which such conflicts become resolved (Pfeffer, 1981, p. 70).

Following the strategic contingencies theory (Hickson *et al.*, 1971), the influential role of accounting departments in pricing decisions could be explained in terms of the three conditions underlying that theory. As mentioned above, the information required by the PC seems to have led

accounting departments to become more involved with marketing departments in pricing decisions. However, despite this task interconnection among the two subunits, it was the accounting departments which possessed the information and expertise that constituted the critical resources. These resources seem to have enabled them to cope with the critical problem which confronted organisations when securing approval for price increases and handling the financial crises which were engendered by the introduction of the PC. Moreover, these critical resources could not be provided by marketing departments. Thus, such a situation appears to have led marketing departments to depend on accounting functions in most aspects of the pricing decision making process.

Although the 1977-79 Price Code used different criteria, there were certain reasons that may have enabled accounting departments to continue handling the new requirements and thereby influence pricing decisions. These included the uncertainty involved in the PC's decision in granting price increases, the risk of being investigated if the Commission was not convinced of the proposed price increase, the expertise developed by accounting departments in dealing with the previous Code, and the information they possessed. Moreover, successful use of power tends to lead to more power, particularly in the face of uncertainty (Pfeffer, Salancik, and Leblebici, 1976). In such a situation, the organisation is likely to turn to people or units which have the best track record. Track records are determined at least in part by the use of power in the past (McCall, 1979, p. 14). However, although marketing departments may have had considerable power over pricing decisions prior to the introduction of the PC, during the second code, track records are more likely to be in favour of accounting departments because they may be perceived as the subunits that possess the critical resources required to handle an important contingency like the PC.^{3,4} Furthermore, those organisational units that are delegated important tasks in the first place can increase their power by coping well with uncertainty (Hickson *et al.*, 1974).

The above analysis on the impact of the two Price Codes tends to support the argument that

³See Pfeffer (1981) for an explanation of a social definition view (e.g. Pondy, 1977) of what constitutes a critical resource, or an important contingency or uncertainty in the studies of Salancik and Pfeffer (1974), Perrow (1970), and Hinings *et al.* (1974).

⁴It is not always the case that the relationship between accounting and marketing staff is similar to the one discussed in the paper i.e. they belong to separate organisational subunits. Indeed, in many consumer product companies, marketing accountants form part of the product marketing team and work closely as part of that team with the product manager. However, none of the companies that participated in this research had this organizational set up.

²See Mitchell (1978) and Hazledine (1979) for more general details on the impact of the PC.

influence is dependent on the nature of the uncertainty facing the organisation. Examining this argument, Salancik *et al.* (1978, p. 253) concluded that:

The influence of a subunit or an individual on a decision is a function of (1) the kind of uncertainty faced by an organization, (2) the particular characteristic or capability which enables reducing organizational uncertainty, and (3) the degree to which a particular subunit possesses this characteristic. As decision-making contexts vary, so do the sources of organizational uncertainty, and consequently, the bases for influence in organizational decision-making.

The nature of the uncertainty engendered by the PC was different in the two eras, and accordingly, the decision contexts which were facing organisations had changed. However, accounting departments seem to have possessed a high degree of the particular characteristics (information and expertise) of dealing with both uncertainties. And, following the argument of Salancik *et al.* (op. cit), since accounting departments were likely to be the most involved subunit in communicating with other organisational subunits about the PC, they would emerge as the most influential subunit in the pricing decision.

A broad working hypothesis was, therefore, adopted as a general framework to the development of the case study:

The shift of power over pricing decisions from marketing to accounting departments was contingent on the information and expertise of the latter to cope with the requirements of the PC for price increases.

Pettigrew's (1973) model of decision making as a political process was used as a framework for examining the issue of power in the case study. The same framework was also used later on in testing the research hypotheses, which were developed from the case study, in the various other organisations.

Pettigrew emphasises the study of decision making as a social process and argues that, as part of such processes, power strategies are employed by subunits to generate support to satisfy their demands which result from differences in specialisations. Such a process will include:

debate about which dilemmas should receive organisations' attention *and* the choice of which alternative courses of action should be adopted to resolve those dilemmas (Pettigrew, 1977, p. 80, emphasis in original).

Thus, an attempt was made to study the pricing decision making process before, during, and after

the life of the PC. This included the following main steps:

1. Identification of who prepared price changes (the bringing of a dilemma into the picture);
2. the way changes in prices were worked out (the various courses of action suggested); and
3. who finally approved the price to be charged (the choice of which course of action was adopted).

Following Kanter (1977) and Salancik and Pfeffer (1977), power in this context was broadly defined to mean the ability of organisational subunits to bring about outcomes which they desired.⁵

The case study and research hypotheses

Introduction

A pilot study to examine closely the possible impact of the PC was conducted in Hekmats Limited,⁶ a leading company in the manufacturing of certain edible products. This is believed to be an appropriate method when a closer knowledge of what was taking place in an organisation is sought, and in grounding the development of research hypotheses (see Hagg and Hedlund, 1979; Ray, 1976; Lupton, 1980; and McClintock *et al.*, 1979).

Interviewing was used to generate information for the case study. The interview guide was divided into five sections to cater for the general background of the firm's market structure and the periods before, during the two Price Codes, and after the life of the PC. In Hekmats Limited, interviews concentrated mainly on the accounting and marketing departments involved in pricing decisions and the handling of the PC's requirements. In total 12 persons were interviewed; five from the accounting department, four from the marketing department, and the directors of the planning and personnel departments and the London Regional Office. In the accounting department, interviews were conducted with the finance director, management accountant, planning and economic manager, and two assistants. In the marketing department, interviews were held with the marketing director, marketing manager, and two assistants. The interviews were carried out over a period of one month. Two copies of the case study were later sent to the finance and marketing directors who validated the data.

The Pre Price Commission Era

The organisational structure of Hekmats Limited comprised four staff departments and three

⁵Influence and dominance were treated as synonyms for power in this research. The three concepts are used interchangeably.

⁶Hekmats Limited is a pseudonym.



regional offices. Each department was represented on the board of directors, except the finance department which did not have a director until 1975. The then management accountant, who was in charge of that department, reported directly to the chief executive. Prior to the PC, the finance department was divided into two, the cost and financial groups.

Before the introduction of the PC in 1973, the company was also controlled by the government in terms of the margins by which it could increase its prices. This was mainly because of the essential commodities which the company manufactures. There were also very few companies in the industry. There was an agreement between Hekmats Limited and the government whereby the former could not increase its prices beyond a certain margin which was negotiated between the two parties. The staff that conducted the negotiation on behalf of the company were from both the marketing and finance departments.

The usual practice during the pre-PC era was that the finance department would identify that a price increase might be required because of an increase in basic costs. The company would then attempt to secure the government's consent to the proposed increase in prices. Once an agreement was reached, it was then the responsibility of the marketing department, in the words of the marketing manager, to 'decide how and when to implement these increases'. The price to be charged would finally be approved by the company's chief executive but this was only a formality.

It seems that the pricing philosophy of the company at that time emphasised the quantity of goods sold. Apparently,

the company had been brought up to a situation where they procured a certain tonnage of raw material, converted it to final products, sold it into the market place and the exports were used as a buffer between the home trade requirements and the capacity, i.e. they balanced their sales capacity against export. (marketing manager)

The role which the finance department was seen to play was similar to that of a 'service' department. It would not push for a price increase, but would only inform the marketing department of an increase in the basic costs. According to an assistant in the finance department, '[the marketing department] was hardly interested in product costing or product profitability but in sales per tonnage'. Under such conditions, it appears that there were no differences between the two departments over pricing decisions.

The company's pricing decisions and policy were discussed at the level of two marketing committees. The membership of the first marketing committee was entirely from the marketing department. Its function was mainly to lay down the guidelines of

the pricing policy to the marketing director who would then discuss them in the second committee. The latter's work was to examine these policies before their implementation. Before the introduction of the PC, the orientation of the second marketing committee was wholly related to what the total sales were going to be. It was chaired by the chief executive and its membership consisted of a number of other directors and managers; however, before 1973, none of the staff from the finance department were amongst its members.

Thus, the power of the marketing department to influence pricing decisions is indicated by its dominance over the two marketing committees, and its ability to use the criteria of the quantity to be sold and the company's market share as a base for price increases.

1973-77 Price Code

The first Price Code meant a new era of government control for Hekmats Limited, but of a different nature because of the strict mathematical formula on which price increases were based and the enormous amount of information that was required on a quarterly basis.

Soon after the introduction of the PC, the role of the finance department witnessed several changes. To start with, the directors' committee decided that the PC's requirements should be handled solely by the finance department. The immediate response of the department was to assign the work of the PC to a number of its staff. Moreover, the role of the finance department was enhanced by the appointment of a finance director in 1975.

Such an increase of resources for the finance department meant a mobilisation of power to support their views in the various institutions in the company which influenced pricing decisions. These included the board of directors as well as the second marketing committee where the membership of the latter was increased to include all the regional directors, the finance director, and the management accountant. The latter two people replaced the then management accountant who had joined the committee after the introduction of the PC. According to the planning director:

the then management accountant didn't hesitate to use his costing information and the PC's rules to pressurise the committee into recommending price increases.

After 1975 the second marketing committee was called the operational committee. Its focus of orientation was also widened to include not only the quantity to be sold but the whole pricing policy. According to the management accountant:

the finance department brought some influence to bear upon the decision to modify the work of that [operational] committee.

Indeed, the role of the finance department became very influential in pricing decisions to the extent that in their discussions in the operational committee the finance director and the management accountant:

didn't confine themselves only to prices and profitability, but started questioning what product should be made and where it should be made. [They] even delved into the logistics of why we [the company] were doing things. (marketing manager)

The shift in the power structure over pricing decisions was also apparent from the remarks of the marketing manager who thought that since the finance director was:

the person who looked after price decisions with the PC, and had at his disposal the information required, he was able to offer advice as necessary. He was the prime mover.

Furthermore, what came over at times, but not frequently, was that at the end of the day, for reasons of self protection or survival, those who could persuade the PC to accept a particular position, had to have their views listened to as this meant literally the survival of the company. This certainly used not to happen before the introduction of the PC.

The finance department also witnessed a change in its structure with more staff being either transferred from other divisions or recruited.

The specifications laid down by the PC meant that it was only by the use of accounting information that price increases could be secured. Such dependency on the accounting information, stated one of the assistants in the marketing department, seems to have 'regulated price increases on a uniform and more regular basis' and made 'cost increases become price increases every quarter'. This pattern of price increases was enhanced by the low level of profitability which the company was experiencing before the introduction of the PC. In addition, during the first Code the market was ready to absorb the price increases granted by the PC. This was primarily because between 1975 and 1977 there was a severe international shortage in the raw material which was used in Hekmats products. Accordingly, the finance department 'demanded the highest price it could justify under the Code' (planning and economics manager).

The need for the accounting information during the first Code appears to have led to a general appreciation in the company of its importance in pricing decisions. As a result, the role of the finance department grew from just providing information to the marketing department to include using that information to influence pricing decisions. Indeed, such a development in the role of the finance department reflects a pricing philosophy which was

aimed at increasing the company's profitability and hence taking 'the utmost of what the Commission allowed'.

Furthermore, according to the finance director, the role of the finance department 'became much more sharply defined as embodying overall control over pricing policy'. Indeed, the finance department pursued the practice of presenting to the operational committee the need for price increases once they established an increase in cost. 'The marketing department would then have to produce a reason why prices should not be increased rather than why they should be increased' (planning and economics manager).

Thus, the power which the finance department derived from the requirements of the PC, enabled it to use accounting information to influence pricing decisions. It should not, however, automatically be assumed that market forces lost their impact on pricing decisions during the PC even if accountants became more influential. Indeed, although the finance department established its dominance over pricing decisions, it is possible that its ability to pursue the practice of increasing prices on a regular pattern by using accounting information might have been due to the decrease in market competitiveness during the first Code. This is possible because under decreased competitiveness the market *may* absorb price increases based on accounting information without serious negative effects on the company's sales.⁷

1977-1979 Price Code

Although the PC's criterion by which prices could be increased was changed, the finance department continued to handle its requirements. This seems to have been:

because the Commission's rules were vague, [and] perhaps one had to listen to the advice of those who were able to understand and interpret them (an assistant in the marketing department).

Following its pricing practice of relating price increases to the cost structure of specific products rather than to increase the prices of all products with a flat rate, the finance department was confronting the marketing department with options either to discontinue producing certain products that were making a loss or to increase their prices. In most cases, the finance department tended to favour the latter alternative and it was able to implement it, despite the strong resistance from the marketing department whose concern was more with the competition in the market. Nevertheless, according to the planning and economics manager:

⁷See Abel (1978) for the role of accounting information in price determination under different market structures.

despite the fact that there was a large element of cost justification in our product costing, it was very much based on how much the market could bear from imports, our domestic competitors, and the differentials between our products.

Under the second code, companies were aware of the risk of being investigated by the PC if it decided that an application for a price increase was not justified. Indeed, at the beginning of the second code era Hekmats Limited was investigated by the PC and 'the decision to put that application was taken primarily by myself [finance director] and was endorsed by the executive committee'. The results of the investigation endorsed the price increase for which the company had applied.

After the investigation, the finance department experienced a change in its organisational structure. The most significant change was the transfer of the marketing economics group to the finance department where it reported to the planning and economics manager. This was seen as a great loss to the marketing department as the role of that group had been to act as a buffer against the finance department. Such a move enabled the finance department to increase its resources as well as to have more direct control over the non-accounting information required for pricing decisions. It evidently meant more power over pricing decisions.

Thus, the results of the investigation seem to have sustained the role of the finance department during the first and second codes, vis-à-vis absorbing the uncertainty and risks which the existence of the PC had engendered.

Both the first and second phases of the PC tend to reveal a relationship between the power which the finance department derived during these two periods and the increase in its responsibilities.

The Post-Code Era

In 1979 the new UK Conservative government decided to abolish the PC. This meant that the uncertainty which the PC created no longer existed. On the other hand, it seems that the market competition which Hekmats Limited was confronting soon after the end of the PC required the information and know-how of the marketing department to handle price increases. According to the marketing director:

it is the market place, [now] more than ever before, that determines the price that can be charged. This is particularly true since our European competitors are becoming very close to our prices and our competitors at home have over the past three years increased their productivity by some 40%.

As a result, the marketing department, according to the management accountant:

started to see themselves capable of doing things more independently from the finance department [which] has attempted to continue its system of price review but, without the legal background [of the PC], there has been little success in convincing the marketing department of rises required for cost increases.

Such a view was confirmed by the finance director who recalled that:

Although we strove to maintain profit margins according to some rules, we only had limited success because the ultimate decision was left to the subjective view of the marketing people... who blocked price increases because the market conditions wouldn't bear it.

After the end of the PC, the perceived importance of the market conditions in price increases also seems to have affected the pricing decision making process in Hekmats Limited. Price changes were still identified by the finance department which would provide the information regarding the changes in costs and the predicted level of profit or loss for each product to the marketing department. The latter would consider it together with the non-accounting information to decide the appropriate increase in prices.

After the abolition of the PC, the difference in pricing philosophies between the two departments were reflected in their attitude. While the marketing department was interested in maximising the volume of sales and was reluctant to increase prices on a regular basis, the finance department was keen to increase prices to maintain the company's profitability.

Nevertheless, despite the above shift of emphasis, the constant use of accounting information in pricing decisions during the two price codes appears to have led to an appreciation of its use in such decisions. The marketing director was aware of this and admitted that:

now, the information... on product costing influences considerably our pricing decisions.

After the abolition of the PC, certain employees in the finance department were released to do other work and the size of the department was accordingly reduced.

Thus, the role of gate-keeper which the finance department used to play during the life of the PC was played by the marketing department between the company and the market place after the PC was abolished. Moreover, the ability of the marketing department in the operational committee to influence price increases according to what the market would bear, appears to have enabled it to regain its power over pricing decisions. This was made possible because the marketing department became less dependent on the finance department

Figure 1
A Framework of the Pricing Practices in Hekmats Limited

	(I)	(II)	(III)	(IV)
<i>Environment Phases</i>	Prior to the introduction of the Price Commission [Government control over margins]	First Code	Second Code	After the abolition of the Commission
<i>State of Competition</i>	Competitive	Not so competitive	Competitive	Competitive
<i>Dominant Group</i>	Marketing Group	Accounting Group	Accounting Group	Marketing Group
<i>Main Influence on Pricing Decisions</i>	Market Competition	Accounting Information	Accounting Information and Market Competition	Market Competition

and also because of its ability to generate information about the market competition which played a very significant role in pricing decisions once more.

Research Hypotheses

Figure 1 summarises the experience of Hekmats Limited. It shows the degree of market competition, the dominant departments and the pricing practices during the eras before, during, and after the PC. From Figure 1 a set of related hypotheses was derived for testing across a sample of UK companies. The aim was to discover whether market competition was the main influence on pricing throughout the four periods of investigation or whether it gave way to the influence of the Price Codes in phases II and III. Hence, it was hypothesised that:

H.1 *Prices were fixed predominantly according to what the market would bear in phases (i) and (iv); and by reference to accounting data in phases (ii) and (iii) irrespective of the state of market competition.*

H.2 *It is the state of market competition which mainly determines when prices can be increased even under price control environments.*

However, we were not just interested in the factors influencing pricing but the *process* by which pricing decisions were taken. Thus, it was argued that, if H.1 was established, then:

H.3 *Non-accounting/non-finance departments dominated pricing decisions in phases (i) and*

(iv); and accounting/finance departments in phases (ii) and (iii) irrespective of market competition.

Additionally, we wanted to examine those phases where the dominant external factor was the state of market competition and to test the hypothesis that:

H.4 *Where market states are less competitive, accountants become more dominant through the company's greater reliance on accounting data to signal price increases irrespective of whether prices are controlled or not.*

Finally, it was also possible that pricing policy was dominated by organisational subunits which did not derive their power from either the state of market competition or the existence of the Price Codes but from some other factors and that they used that power to improve their own control over pricing. Hence:

H.5 *The dominant department will tend to enforce its own pricing philosophy on the company irrespective of the state of market competition or the existence of price control.*

However, H.5 could only be tested in this research if subunits' dominance did not change with changes in the state of either market competition and/or the existence of the Price Codes. In this context, philosophy is viewed as a reflection of the way in which dominant departments used certain type of information to increase prices. In the next section, the concept of competition is examined and the selection of the sample is outlined.

Figure 2
Classification of companies according to economic measures of competition

<i>Highly Competitive</i> Concentration Ratios 0–55	<i>Not Highly Competitive</i> Concentration Ratios 56–80	<i>Less Competitive</i> Concentration Ratios 81–100
South Pacific Ltd. Ascot Product R S.R.D. Ltd.	Beta Ltd. Tecno Product Z Ascot Product S	Rank Ltd. Newbridge Ltd. Tecno Product X Blue Nile Ltd. United Ltd.
All names are fictitious. Companies insisted on confidentiality as a condition of access.		

Measurement of competition and sample selection

Perception of Competition

In this study, rather than using the market or industry as a unit of analysis in measuring the competitiveness of organisations (as is usually the case in economic theory), decision makers' perception of competition was investigated. A similar approach was used by Pfeffer and Leblebici (1973) in measuring competition and by Dill (1958) and Duncan (1972) in measuring environment.⁸

A competitive situation was considered to exist if managers perceived that an increase in prices would lead to a significant reduction in the firm's market share. On the other hand, if they perceived that price increases would not substantially affect their market share then this was interpreted to mean that the firm was operating in a less competitive market. Furthermore, perception of different degrees of market share reduction and their reasons were probed.⁹

Selection of Industry

In selecting the sample, attention was given to the market structure in which the interviewed firms operated. Although it was perception of competition which was relevant to the study, it could not be determined in advance of selecting a sample and so companies could only be selected on economic measures of competition. Hence, concentration ratios were used.¹⁰

In order to cater for the different market states on pricing practices, our sample was selected from highly competitive, not highly competitive, and less competitive industries. These three categories were respectively identified by the following ranges of

concentration ratios: 0–55, 56–80, 81–100.¹¹ It was originally planned to interview eighteen firms (six from each category), but, out of the thirty companies that were approached only nine agreed to participate in the research. They are shown in Figure 2. Furthermore, although the sample consisted of nine firms, eleven major products were considered because two companies both manufactured two products which came under different categories of competition. Each major product was considered separately in the interview to establish their market competitiveness. In four companies one person was interviewed from each of the accounting and marketing departments; however, in each of the remaining five firms only one person was interviewed. Apparently, in the latter cases, companies had no more than one person who was familiar with the work of the PC and had been employed at least since its introduction. All interviews were tape recorded except in two companies where notes were taken, verbatim where necessary. In the next section the findings and conclusions are presented.

Findings and conclusions

Findings

Figures 3, 4, 5, and 6 summarise the main findings of the four phases that were studied; namely the pre-PC era, the two Price Codes periods, and the post-PC era, respectively.

The evidence emerging from the empirical work, which was undertaken initially at Hekmats and latter tested in the other nine companies, tends to substantiate H.1 and H.3. Support for these two hypotheses indicates that when the Price Codes were in operation during 1973–79 *they were the dominant external factors that governed the pricing practices and not the state of market competition encountered by each of the companies interviewed*. This contradicts the findings of Evelyn (1976) who

⁸One of the reviewers also drew my attention to a paper by Archibald (1959) in which he provides a justification of perceptual measure of competition.

⁹A copy of the questionnaire is available from the author.

¹⁰The information on market concentration was obtained from the Census of Production (UK) using sales as the size of the enterprise for ranking purposes.

¹¹The ranges used in concentration ratios are inevitably arbitrary (see Evelyn and Little, 1960).

Figure 3
Companies' pricing practices prior to the introduction of the Price Commission according to the decision makers' perceptions

Company	Redstone	Blue Nile	Newbridge	Tecno X & Z	United	Beta	Ascot S & R	South Pacific	S.D.R.
Degree of Competition	Competitive	Competitive	Uncompetitive	Competitive	Competitive	Competitive	Uncompetitive S R	Uncompetitive	Competitive
Dominant Department	Marketing	Marketing	Accounting	Marketing	Marketing	Marketing	Marketing	General Management	Marketing
Pricing Practice	Market Conditions	Market Conditions	Accounting Information	Market Conditions	Market Conditions	Market Conditions	Market Conditions	Accounting Information	Market Conditions

Figure 4
Companies' pricing practices during the 1973-77 Price Code according to decision maker's perceptions

[illegible]

Figure 5
Companies' pricing practices during the 1977-79 Price Code according to the decision makers' perceptions

Company	Redstone	Blue Nile	Newbridge	Tecno X & Z	United	Beta	Ascot S & R	South Pacific	S.D.R.
<i>Degree of Competition</i>	Competitive	Competitive	Uncompetitive	Competitive	Competitive	Competitive	Uncompetitive S R Competitive	Uncompetitive	Uncompetitive
<i>Dominant Department</i>	Marketing	Marketing	Accounting	Accounting	Accounting	Accounting	Accounting	Accounting	Accounting
<i>Pricing Practices</i>	Market Conditions	Market Conditions	Accounting Information	Accounting information but also market considerations	Accounting Information	Accounting Information	Accounting Information	Accounting Information	Accounting Information

Figure 6
Companies pricing practices after the abolition of the Price Commission according to decision makers' perceptions

Company	Redstone	Blue Nile	Newbridge	Tecno X & Z	United	Beta	Ascot S & R	South Pacific	S.D.R.
<i>Degree of Competition</i>	Competitive	Competitive	Uncompetitive	Competitive	Competitive	Competitive	Uncompetitive S R Competitive	Uncompetitive	Competitive
<i>Dominant Department</i>	Marketing	Marketing	Accounting	Marketing	Marketing	Marketing	Marketing	General Management	Marketing
<i>Pricing Practices</i>	Market Conditions	Market Conditions	Accounting Information	Market Conditions	Market Conditions	Market Conditions	Market Conditions	Accounting Information	Market Conditions

attempted to study the effect of the first Price Code in determining price levels. He argued that:

The consensus view emerging from the survey was that since the onset of the recession the dominant factor governing prices has been market conditions rather than the controls inherent in the Price Code (1976, p. 50).

However, the cases of Redstone and Blue Nile suggest that we should treat the above findings with some caution. In both companies the changes in the tax structure on the products pertaining to their industry were considered more important than the Code. Although this would suggest a role for accounting and not market considerations, both companies were more concerned with the impact of the change on the prices they would charge. This seems to have reversed the balance of power and enabled the marketing departments to increase prices according to what the market would bear. Hence the pricing practices of these two companies during the Second Code give supporting evidence for H.2 which means that it was the state of market competition and not the Price Codes that determined prices. Nevertheless, the situation of both companies is still in line with the general argument of the research which claims that subunits' power is not constant over time but varies with the changes in the environment that are relevant to pricing decisions. Indeed, the notion that power is not constant over time is hardly spelt out in the organisation theory literature. The views expressed are essentially static in that little attention is given to those processes whereby power is accumulated or diminished in a relationship. Pfeffer (1977) justifies this by suggesting that:

because power can be used to affect allocation decisions, which then provide symbolic reaffirmation to relative influence as well as the resources to maintain power, it is the case that the distribution of power within organisations is most often quite stable. Only external contingencies that can no longer be adequately handled, or mistakes in managing the internal coalition can produce meaningful shifts in the distribution of influence within organisations (1977, p. 255).

Clegg (1977) also implies that the relative power position of two groups should not be taken as always static.

During phases (i) and (iv), the state of market competition was the external dominant factor that determined prices. Although H.3 suggests that under such conditions the marketing department would be dominant, the case of Newbridge tends to give support to H.4. However, the case of Newbridge seems to be the exception because of the absolute absence of price competition in that industry and the result that the marketing de-

partment hardly had any role in pricing decisions. On the other hand, the case of Ascot product (S) throws doubt on H.4 because of the dominance of the marketing department over pricing decisions where the market state is uncompetitive during the eras prior to and after the abolition of the PC. Apparently, this was largely due to the importance of maintaining the market leadership of this well established product.

Furthermore, the pricing practices of South Pacific during the same two phases are also worthy of attention. It seems that, while prices were increased by reference to accounting data, because of the uncompetitive market state which this company was facing, it was the general management department which dominated pricing decisions. The power of that department was derived from the organisational structure of the company which gave the department the sole responsibility over pricing decisions.

Hence, the experience of some organisations tends to suggest that there are other factors which influence the pricing process, namely product tax structure, organisational structure, and product market leadership. However, it is very difficult to establish the significance of these factors from the research sample.

Taking the cases of Newbridge, Ascot (S), and South Pacific together, there at least seems to be weak evidence suggesting that accounting approaches are more crucial in less competitive markets. However, wider studies comparing degrees of market competition with accounting versus marginalist pricing practices might explain much.

In reviewing the four phases together it can be seen that no evidence was found that would substantiate H.4.

Conclusions

The advent and abolition of the PC has provided a good opportunity to study how certain environmental factors may affect corporate pricing practices. Elaborating on the strategic theory of power, the findings emerging from the research suggest that, while pricing decisions are influenced by external market forces, the mechanism by which prices are settled will be influenced by organisational subunits' power which will not necessarily be constant over time because of environmental changes. Hence, when accounting or marketing departments are in power they will tend to use accounting or marketing information respectively to influence pricing decisions.

Although the findings of this research need to be tested with a larger sample, there appears to be enough justification for further research that consists of more in-depth studies dealing with a wider range of organisational factors involved in the

process of arriving at pricing decisions or similar strategic decisions. Such studies might also explore the impact of specific issues that take place in the pricing environment on organisations' pricing practices. Moreover, we would then learn how such environmental factors tend to have an impact on the role and purpose of accounting functions in organisations and come more fully to understand what accounting is.

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THE ACCOUNTING HISTORIANS JOURNAL

Semiannual Publication of The Academy of Accounting Historians

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Spring 1988

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The Small Company Audit Qualification: A Preliminary Investigation

K. Keasey, R. Watson and P. Wynnarczyk

Abstract—In recent years there has been much debate in the UK regarding the value and feasibility of the small company audit. The lack of formal internal control systems and the application of universal auditing standards has given rise to the use of a special 'Small Company (Example 6) Audit Qualification'. However, doubts concerning the uniformity of practice between auditors has created difficulties for users in interpreting its meaning. This paper examines the extent to which a number of financial, organisational and auditor variables are able to explain the receipt of a 'Small Company Audit Qualification'. The main empirical findings, using multivariate logistic analysis on a sample of 540 small company reports, are that companies audited by large audit practices, companies which had a prior year qualification, a secured loan, declining earnings, large audit lags and few non-director shareholders were more likely to receive an audit qualification than other companies.

Introduction

Over the past few years there has been much debate in the UK as to the necessity, value, scope and feasibility of the audit requirement for small companies. Various arguments have been put forward in favour of the abolition and/or the application of different standards for small company audits. Generally, these arguments focus upon cost/benefit considerations and the feasibility of auditing shareholder-managed companies where, due to the lack of formal management control and recording systems, the auditor has to rely largely upon management assurances.

The accountancy profession's response to these well-known problems relating to small company audits was the introduction of a special 'small company (Example 6) audit qualification' (APC, 1980 and 1983). This has been viewed as unsatisfactory, largely because doubts exist as to the uniformity of practice across auditors in issuing the qualification. Such non-uniformity of practice is claimed to create considerable difficulties of interpretation for small company account users (see Page, 1985).

Whilst a large part of this debate has hinged upon the current practices of small company auditors, empirical evidence on this topic appears to be scarce. The major purpose of this paper is, therefore, to investigate empirically whether organisational, financial, size and auditor variables possess any explanatory power in respect of the receipt of a 'small company audit qualification'.

The paper is organised into four sections. The first section examines the background to the debate. It includes a discussion of cost/benefit considerations, the typical ownership and management structure of the small company, the small company auditor and the small company audit qualification.

The second section describes the data set, the model, the variables and the empirical methods used to investigate the factors contributing to receipt of a small company audit qualification. The third section presents our univariate and multivariate empirical findings. The final section provides a discussion of the results and their implications for the debate on small company auditing.

The small company audit, audit qualification and auditors

Current Requirements

Currently in the UK there is a statutory requirement for an annual audit of all companies irrespective of size or organisational structure. Moreover, the Companies Act requires the auditor to express an opinion as to whether the accounts present a 'true and fair' view of the company's state of affairs. In forming an opinion, the Auditing Standard stipulates that:

the auditor needs to obtain the same degree of assurance in order to give an unqualified opinion on the financial statements of both small and large companies (APC, 1980, Section 11).

Thus, Auditing Standards are intended to be universal in application and no explicit concessions are made to small company audits which might limit either their scope or allow the auditor to incorporate cost/benefit considerations when forming an opinion.

The Costs, Benefits and Feasibility of the Audit

Some critics have argued that the current imposition of universal standards results in small companies having to bear a cost which is claimed to be:

- (i) disproportionately high for small companies, and
- (ii) unjustifiable since little or no compensatory benefits accrue to account users.

Costs

The major reason why audit costs are likely to be disproportionately high for smaller companies arises from the existence of large fixed cost elements, such as planning, review and checking compliance with the Companies Act and Accounting Standards. This implies that, unlike large companies, small companies are generally unable to take advantage of any economies of scale. This cost-based argument, however, tends to lose much of its force when it is appreciated that most small companies also have their accounts prepared at the same time by their auditors. The audit will, therefore, generally involve relatively little in the way of incremental costs (see Carsberg, *et al.*, 1985). Some critics (e.g. DTI, 1985b; Rutteman, 1985), however, have argued that even the relatively small costs associated with the audit are unjustified since neither internal nor external users of the accounts derive any benefits from the audit.

Benefits to External Users

Annual audited accounts, it is argued, will generally be of little use to external user groups since they will normally have other means of obtaining financial information on the company. For many users, such as bankers, suppliers and customers, more timely and relevant sources of information can be obtained from daily bank balances, management forecasts and trade or bank references.

A recent survey (Berry, Citron and Jarvis, 1987) into the information needs of bankers found, however, that irrespective of the size of the client company, the full statutory audited accounts were, both in terms of perception and actual usage, the most important source of documentary information when making lending decisions. The audit report itself was deemed to be very important and was 'read thoroughly' by some 91% of bankers. Moreover, alternative sources of information such as management accounts and forecasts were seen by the bankers as inferior to audited accounts because they were 'less reliable' and, for many small companies, either did not exist or were not readily available due to lack of accounting expertise within the company.

Benefits to Internal Users

The major distinguishing internal control and ownership characteristic of small companies is that the major shareholders are generally also working directors personally involved in the day-to-day control of the business. The traditional 'stew-

ardship' function of the audit would thus seem to be of limited relevance for many small company shareholders. Benefits accruing to the director/shareholders from an audit are, therefore, likely to be minimal since they will normally already have free access to this information.

A counter-argument to the above (White, 1985) is that the annual audit often improves the reliability and/or usefulness of the financial information available to shareholder-directors. The lack of accounting expertise within many small companies often means that the 'housekeeping' and 'discipline' imposed on the staff and management by the annual audit requirement is essential for the production of any reliable or consistent financial information for both internal and external users.

The Feasibility of the Small Company Audit

Recognition of the typical organisational characteristics of small companies raises doubts concerning the feasibility of the small company audit. The central issue is that, since most small companies have limited formal internal controls and because their auditors have limited independent means of ascertaining whether or not any controls which do exist have been overridden by the management, the auditors have to take 'on trust' much of the information supplied by the management.

This reliance upon management representations for much verification work inevitably raises doubts as to the meaning of the term 'true and fair' in the small company audit report. The inherent difficulties of carrying out small company audits may, however, merely imply that large company audit standards are inappropriate for small company audits, not that the whole exercise is worthless or infeasible. The current imposition of universal standards, which appears to be based on the premise that small companies are merely scaled-down versions of large companies, may well be infeasible. The adoption of 'less exacting' standards, explicitly designed for small companies, could, however, prove worthwhile.

The Small Company Audit Qualification

In response to the above problems the Auditing Practices Committee (APC), rather than examining the possibility of 'dual standards' which would have allowed auditors to apply less exacting standards for small company audits, issued an Auditing Standard (APC, 1980 and 1983) which allowed for a special form of 'subject to' small company audit qualification. The suggested wording of the audit report for small companies is shown in Figure 1.

This solution, however, has attracted considerable criticism, not least because it would result in substantial numbers of companies receiving an

Figure 1**Example 6:****Qualified audit report**

Uncertainty—subject to: acceptance of management assurances (Small business)

**AUDITORS' REPORT TO THE
MEMBERS OF**

.....
We have audited the financial statements on pages ... to Our audit was conducted in accordance with approved Auditing Standards having regard to the matters referred to in the following paragraph.

In common with many businesses of similar size and organisation the company's system of control is dependent upon the close involvement of the directors/managing director (who are major shareholders). Where independent confirmation of the completeness of the accounting records was therefore not available we have accepted assurances from the directors/managing director that all the company's transactions have been reflected in the records.

Subject to the foregoing, in our opinion the financial statements, which have been prepared under the historical cost convention give a true and fair view of the state of the company's affairs at 31 December 19... and of its profit and source and application of funds for the year then ended and comply with the Companies Acts 1948 and 1967.

Source: APC (1980).

audit qualification for no other reason than that they were small companies with relatively undeveloped formal internal control systems. As Page (1985, p. 216) has noted:

because the Companies Act requires the auditor to form an opinion, there is a professional bias to using qualification of the audit report sparingly to preserve its effectiveness, and clients would be expected to resist it.

Furthermore, considerable doubts exist concerning the uniformity of practice between auditors in the issuing of this qualification. This non-uniformity, it is claimed, creates acute problems for account users in interpreting its meaning:

Does the report just mean that the company is a small company without much internal control? Does the report mean that even if he had no counter-evidence the auditor had some doubt about the explanations? Does the auditor think the directors have actively misled him? All these interpretations seem possible... Which explanation is most likely would seem to depend on the prevalence of use of the suggested wording, both by the auditors generally and among the clients of the auditor giving the re-

port... The frequency of use of the report probably varies quite a lot among auditors; some probably use it frequently, perhaps for the majority of their reports, some auditors may hardly ever use it. The user of accounts is therefore unable to interpret the report. (Page, 1985, pp. 217-218)

Given the above, in order for the user of an individual set of qualified accounts to begin to gauge its meaning, he or she would need to know if the company's auditor routinely issued qualified reports to all its small clients, or whether there was some other reason, more fundamental and specific to the client, for the qualified opinion. Note, however, that no empirical evidence of either the actual incidence of qualified opinions, the non-uniformity of practice between auditors or experimental findings demonstrating that users do indeed find difficulty in interpreting the qualified report was actually cited. This is because, to our knowledge, no systematic empirical study has been undertaken on this topic.

The Small Company Auditor

There have been no systematic empirical studies concerned with possible non-uniformities in audit practice within the small company sector. However, a US study by Warren (1980), based upon the large company sector, found that there were significant differences in the percentage of qualified audit reports issued by different sized audit practices. The available experimental evidence concerned with auditor independence, auditor/client relations, the provision of management advisory services (MAS) and audit judgements (Lavin, 1976, 1977; Lavin and Libby, 1977; Firth, 1980, 1981; Wright, 1983; McKinley, Pany and Reckers, 1985) also tends to suggest that the decisions of auditors from different sized practices may differ considerably.

Moreover, differences in practice, 'quality', or the degree of adherence to accounting and auditing standards are likely to be even greater within the small sector. The primary reason is that, unlike large listed companies which are audited solely by large audit firms, a small company can be audited by any size of audit practice. The greater variety of professional backgrounds, training, experience and expectations between individual auditors of small companies may, therefore, be expected to produce less uniformity.

More specifically, there are a number of reasons why one might expect small audit firms to be less likely than large audit firms to qualify their audit reports. First, larger audit firms may offer greater supervision and training to their managers, and thus may be more able to offer a higher quality of audit. Second, as larger firms of auditors operate highly structured auditing procedures, the client

firm is less likely to be able to apply pressure to an individual auditor to obtain a preferred outcome. For instance, Knapp (1985) found that client firms were less likely to obtain their preferred outcome when the specific issue was dealt with by a technical standard.

Third, as argued by De Angelo (1981), large audit practices which deal mainly with large, highly visible, public companies, face a different risk-return function from small auditing firms. The possibility of incurring high litigation costs and a loss of reputation may give large audit practices a greater incentive to qualify their clients' accounts whenever they are required to by professional standards.

Fourth, it is possible that the partners of small audit firms are more likely to develop close personal relationships with the directors of their small client companies. Such close personal relationships with clients may, if the client resists, make them less inclined to qualify the accounts. Fifth, it seems probable that the partners and employees of 'small' audit firms will be more familiar with small company accounts than their large audit firm counterparts and, in consequence, may have lower expectations in respect of 'minimum acceptable standards of control'. Furthermore, small audit firms are more likely to design and prepare the accounts they audit. Consequently, confidence in the accounts is likely to be higher and the probability of issuing a qualification lower.

In contrast to these arguments, however, over the period examined by this study, large audit firms were trying to increase their presence in the small firm sector. One might hypothesise, therefore, that the large audit firms might be tempted to attract small firm business by 'loss leading' on the qualification front. Also, if Chow's (1983) arguments concerning self-selection bias are valid, the coefficient for an auditor variable should be insignificantly different from zero.

Data, model and variables, and empirical methods

Data

The data used in this paper comes from the financial records and accompanying documents filed at Companies House for 180 single plant, independently owned manufacturing companies operating in the North East of England covering the three-year period 1980 to 1982. The data is a sub-sample of a much larger data base, consisting of approximately 700 companies constructed for an ESRC funded project on small-firm failure.¹

¹For a comprehensive description of the characteristics of the full database, see Storey *et al.* (1987). The present sample was randomly selected with the exception that a few companies which received other audit qualifications, such as 'going concern' qualifications, were excluded.

Three years of data were chosen because this would offer a large pooled data set, if the individual year functions were not significantly different from one another. The years 1980 to 1982 were chosen for two reasons. First, 1980 was the year in which the Auditing Standards and Guidelines were first published and, second, this three-year period was the most recent from the larger data set to offer large numbers of complete information cases. Thus, if each year of data is treated as a separate case, the total number of available observations is 540. Of these 540 observations, 114 (or 21%) had a small company (Example 6) audit qualification.² The proportion of the present sample with qualified reports appears to be slightly lower than the 26% with small company audit qualifications reported by the Carsberg *et al.* (1985) study. However, as can be seen from Table 3, there appeared to be a tendency for this type of qualification to become more common over the period. Thus, whilst in 1980 only 31 out of 180 companies (17.2%) received an Example 6 audit report, in 1982, some 42 companies, or 23.3% of the sample, had their audit reports so qualified.

Model and Variables

Given the data available from Companies House microfiches, the arguments reviewed earlier, and the particular nature of the small company audit qualification, the general model used to determine which factors influence the receipt of a small company audit qualification is as follows:

$$Y = f(X_1, X_2, \dots, X_{12})$$

Where Y is the dependent variable, coded 1 if a small company audit qualification has been received in any specific year and 0 if otherwise. The independent variables included in the model are described below and are summarised in Table 1.

X_1 is defined as the number of directors at the date of the audited accounts. This has been included to capture the possibility that companies with few directors will be unlikely to have formalised accounting and management control systems. We hypothesise, therefore, that the larger the number of directors the less likely is a company to receive a small company audit qualification.

X_2 is defined as the number of non-director members.³ Companies with a larger number of non-director members should have recourse to a larger pool of skills and capital than those companies with few non-director members. Con-

²In approximately 20% of cases the audit report did not use the recommended wording shown in Figure 1. However, the wording actually used was sufficiently close for us to be confident that it was a small company qualification. None of the audit reports contained a 'disclaimer of opinion'.

³The number of non-director members was taken from the microfiches available from Companies House.

Table 1*Dependent Variable*

Coded 1 if small firm audit qualification received and 0 otherwise

*Explanatory Variables**Description**Expected Sign*

X_1	Number of Directors	-ve
X_2	Number of Non-Director Members	-ve
X_3	Audit Lag in Months	+ve
X_4	Total Assets	?
X_5	Loans/Total Assets	+ve
X_6	Change in Loans/Total Assets	+ve
X_7	Change in Disposable Profit/Total Assets	-ve
X_8	Extraordinary Items coded 1, 0 otherwise	+ve
X_9	Secured Loan, coded 1 if a firm has a secured loan, 0 otherwise	+ve
X_{10}	Auditor Size, coded 1 if Auditor in top 20, 0 otherwise	?
X_{11}	Prior Year Qualification, coded 1 if prior qualification, 0 otherwise	+ve
X_{12}	Change in Auditor, coded 1 if change, 0 otherwise	?

sequently, such companies should be less risky and therefore less likely to receive an audit qualification.

X_3 is the lag in months between the accounting year end and the signing of the audited accounts. It is designed to test the hypothesis that the longer the delay between the accounting year end and the signing of the accounts, the more likely a company is to receive an audit qualification. This may be due to either a 'difficult' audit, perhaps where client and auditor are in disagreement, or simply due to the coldness of the audit trail.

X_4 is defined as total assets. This size measure has been included because it seems probable that larger small companies will have more formal and developed internal financial control systems and will, therefore, be less likely to receive a qualification. Alternatively, the larger firm may be more likely to receive a qualification because of its greater public visibility.

X_5 is defined as loans over total assets.

X_6 is defined as the change in loans over total assets. For both variables X_5 and X_6 a positive association with the dependent variable would be expected as they are measures of company risk. In addition, a company with high gearing is more likely to be scrutinised by external parties and the risk to the auditor, in terms of loss of reputation and possible litigation, will be higher.

X_7 is the change in disposable profit divided by total assets. This is included to capture the possibility that an audit firm which realises there is little risk of legal exposure due to the client's increasingly healthy financial position may be less motivated to resist management pressure and, therefore, a qualification is less likely. Similarly, a

client firm which has declining earnings may be more likely to receive a qualification because the auditor has to allow for the possibility of additional write-offs. Knapp (1985) and Warren (1975) both report results for large client firms which support the above arguments.

X_8 is a dummy variable coded 1 if the company reports an extraordinary item in its profit and loss account, and 0 otherwise. This has been included to capture the possibility that unusual non-recurring events may be associated with the receipt of a qualification.

X_9 is a dummy variable, coded 1 if a company has a secured loan and coded 0 otherwise. The same arguments pertain to this variable as to variables X_5 and X_6 .⁴

X_{10} is a dummy variable, coded as 1 if the audit firm was amongst the top 20 largest accounting practices⁵ and as 0 otherwise. The discussion above offered a number of hypotheses as to why one might expect large firms of auditors to have a differing attitude towards qualifications than small firms of auditors. Clearly, the research conducted here must be considered preliminary in that it can only ask if there is an auditor effect. If such an effect is found to exist then other research will need to be conducted to ascertain which of the above reasons is underpinning the effect.

X_{11} is defined as the receipt of a small company audit qualification in the previous year. This is

⁴Information on whether a loan was secured is available from Companies House records.

⁵An audit firm has been defined as being in the top 20 auditors if it appeared in 'Top 20 Accountants by Fee Income' (*Accountancy*, November 1983).

included in some of the empirics because, as noted by Page (1985), some auditors appear to adopt a policy of qualifying all their small clients' accounts, whilst others appear to qualify their small clients only when they have some doubts regarding the assurances of the directors.⁶ Thus, by including X_{11} on the right-hand side of the model we are able to isolate the determinants of a 'non-recurring' or 'one-off' audit qualification.

X_{12} is defined as change in auditor, coded 1 if a firm had changed its auditors within the previous two years, and 0 otherwise. One reason for including this variable is that a new auditor is likely to be relatively unfamiliar with the company, its directors and methods of control and may, therefore, be more inclined to qualify the audit report.

The above list of explanatory variables captures most of those which seem relevant to explaining the receipt of a small company audit qualification and for which data were available from Companies House microfiches. However, due to the limitations of publicly available information, we were not able to include some variables which might be relevant. For example, we have not included a variable to cover provision of management advisory services, despite its significance in the large firm literature. Similarly, we have not included a variable which relates to whether the accounts were drawn up by the auditors even though anecdotal evidence suggests this is more often the case for small firm auditors than auditors from large practices.⁷

Another, potentially important, variable which has been omitted is whether a company has recently installed a microcomputer to store and process the accounting records. As Bhaskar and Williams (1986) have noted,

the auditing of small businesses has always been problematic and the advent of cheap micro-computer based systems could exacerbate the situation.

This is primarily because, for most small business systems, no automatic audit trail will normally exist. Standing data can, therefore, be easily altered without a log being kept of the changes. In addition, the auditors will often lack the necessary expertise either to offer suitable advice or to check the integrity of the system.

Finally, although this is not a function of the limits of the data, we have not included an industry variable. The sample for this study was randomly drawn from twelve broad, 1981 Standard Indus-

trial Classification (SIC) manufacturing sectors. Whilst there may be important differences between service and manufacturing sectors (such as the proportion of cash transactions) which may create particular difficulties for auditors, we can think of no convincing arguments which suggest this may be the case between individual manufacturing sectors. The close control and verification issues which create problems for small company auditors will be common to most manufacturing industries. Furthermore, the inclusion of industry dummy variables into the multivariate model were not significant and their inclusion had no noticeable effect upon either the magnitudes or signs of the other explanatory variables.

Empirical Methods

Given the nature of the dependent variable, and the existence of dichotomous and continuous independent variables, some of which deviated from normality, the univariate results presented in the next section will be based, where appropriate, upon chi-square tests, *t*-tests and Mann-Whitney U tests. Whilst univariate results offer some indication of the importance of the hypothesised variables listed above, it seems clear that there are a number of possible determinants of receiving an audit qualification. The presence of a dichotomous dependent variable and dichotomous independent variables means that logit analysis is the most suitable multivariate estimating instrument.

Empirical results

The empirical evidence presented in this section is based upon the full pooled data set of 540 observations. Whilst pooling the data across years implies that not all observations will be truly independent, the greater number of observations does, however, simultaneously increase the probability of observing any genuine relationships whilst minimising the possibility of picking up spurious positive results. As the empirical results for the individual years of data were not significantly different from one another or from the pooled data set, any possible problems relating to non-independence would appear to be minimal. Full results for the individual years will not, therefore, be presented.

Univariate Results

Univariate results for the present sample are presented in Tables 2 and 3. Table 2 presents summary statistics which indicate the magnitude of the differences in the independent variables between the qualified and unqualified reports and Table 3 presents a more detailed analysis of the pattern of qualifications over the period 1979 to 1982.

Examination of section A of Table 2 shows that slightly over 80% of the annual reports were

⁶A recent study into the ability of non-financial variables to predict small company failure (Keasey and Watson, 1987) found that only non-recurring audit qualifications and 'going concern' qualifications were useful in predicting failure.

⁷No information on whether the auditors also prepared the accounts is available from Companies House records.

Table 2
Univariate results: Summary Statistics
Section A: Categorical Variables

Variable			Qualified	Unqualified	Chi-square
X_8	Extraordinary Item	No	107	400	0.0
		Yes	7	26	
X_9	Secured Loan	No	33	267	2.8
		Yes	81	159	
X_{10}	Auditor Size	Local	56	379	91.2
		Top 20	58	47	
X_{11}	Prior Year Qualification	No	63	385	78.4
		Yes	51	41	
X_{12}	Change in Auditor	No	86	324	0.0
		Yes	28	102	

Note: reject H_0 at 0.1, 0.05 and 0.01 levels of confidence if Chi-square is >2.7, 3.8 and 6.6 respectively.

Section B: Continuous Variables

Variable		Qualified			Unqualified			Test Statistic	
		Mean	Median	σ	Mean	Median	σ	t	z
X_1	No. of Directors	2.88	2.00	1.32	2.99	3.00	1.22	0.8	1.2
X_2	No. of Non-director Shareholders	0.29	0.00	0.98	0.83	0.00	1.72	4.5	3.9
X_3	Audit Lag (months)	7.51	6.00	4.78	6.19	4.00	4.42	2.7	3.5
X_4	Total Assets (£m's)	0.34	0.09	0.78	0.24	0.07	0.58	1.3	1.6
X_5	Loans/Total Assets (%)	32.3	27.2	24.3	33.0	29.1	22.2	0.3	0.7
X_6	Change in Loans/Total Assets (%)	5.2	4.3	16.8	5.8	3.8	16.7	0.3	1.2
X_7	Change in Disposable Profits/Total Assets (%)	-3.3	1.5	35.2	3.5	3.1	18.7	2.0	1.8

σ = standard deviation.

Test statistics: t = Student's t ; z = Mann-Whitney U test.

Note: reject H_0 at 0.1, 0.05 and 0.01 levels of confidence if t or z is >1.3, 1.6 and 2.3 respectively for a one-tail test and if t or z is >1.6, 2.0 and 2.6 respectively for a two-tail test (see Table 1 and text to determine whether a one or two-tailed test is appropriate).

audited by small firms of auditors. However, of the 105 annual accounts audited by Top 20 auditors, some 58 (55%) received a qualified audit report compared to only 12.9% of the 435 cases audited by small audit firms. The Chi-square statistic of 91.2 indicates that the null hypothesis of no difference between large and small audit firms in the issuing of Example 6 qualifications can be rejected at a 0.01 level of confidence.

Of similar statistical significance (chi-square of 78.4) is the receipt of a prior year qualification, where 51 of the 92 reports with a prior year qualification also received a qualified report the following year. The only remaining categorical variable which is significant at conventional levels of confidence (0.1) is the secured loan variable. Here, 33.8% of cases with secured loans received qualified audit reports compared with only 11% of observations without secured loans.

Summary statistics for the continuous variables are presented in section B of Table 2. Despite the non-normality of some of the distributions, both the Student's t test and Mann-Whitney U test give similar results. The tests indicate that there are significant differences at 0.01 levels of confidence between qualified and unqualified audit reports both in terms of the number of non-director members and the audit lag. These differences are of the expected sign, positive in the case of the audit lag and negative in the case of the number of non-director members.

Only two other continuous variables appear to exhibit statistically significant differences (at 0.1 levels of confidence) between qualified and unqualified audit reports. These are the Total Assets variable, which indicates that the larger companies are more likely to receive an audit qualification, and the change in disposable profits

Table 3
Pattern of Qualified Audit Reports over the Period 1979–1982
Section A: Qualified Audit Reports by Year and Auditor

Auditor	Year				Total
	1979	1980	1981	1982	
Top-20*	12	18	20	20	58
	34.3%	51.4%	57.1%	57.1%	55.2%
Local	8	13	21	22	56
	5.5%	9.0%	14.5%	15.2%	12.9%
Total	20	31	41	42	114
	11.1%	17.2%	22.8%	23.3%	21.1%

*35 of the 180 companies (19.4%) were audited by Top 20 firms in each year.

Section B: Analysis of 1979 (Pre-Example 6) Qualifications

	Top 20		Local		Total	
	No.	%	No.	%	No.	%
Non-Compliance with Accounting Standard	1	8.3	1	12.5	2	10.0
Insufficient Information/Lack of Independent Confirmation	5	41.7	2	25.0	7	35.0
Stock Valuation	4	33.3	3	37.5	7	35.0
Other	2	16.7	2	25.0	4	20.0
Total	12	100.0	8	100.0	20	100.0

as a proportion of total assets, which indicates that negative changes in earnings increase the likelihood of receiving a qualified report.

Overall, Table 2 indicates that receipt of the small company audit qualification is significantly associated with the existence of a secured loan, the size of audit practice, a prior year qualification, the number of non-director shareholders, the length of the audit lag, the size of total assets and the change in disposable profits.

Table 3 presents the pattern of qualifications over the four years covered by the study. Section A of the table presents the number and percentage of audit reports which were qualified each year for both Top 20 and 'Local' audit practices. As can be seen from the table, there was a tendency for progressively more companies to receive a small company qualification over the three-year period immediately after its introduction (17.2% in 1980 rising to 23.3% in 1982). This tendency was, however, far more marked for companies audited by small firms of auditors than for those audited by Top 20 audit firms.

Moreover, the relative numbers of companies which received qualified reports in 1979 indicates that the Top 20 audit firms were far more likely to issue other types of audit qualification prior to the introduction of the Example 6 qualification. An analysis of the 20 qualified audit reports received in 1979 is presented in Section B of Table 3. As can be seen from the table, 5 of the 12 (41.7%) qualified reports issued by Top 20 firms in 1979

were due to the auditor having 'insufficient information on which to form an opinion' or 'lack of independent confirmation of some figures/items'. In addition, a further 4 qualified audit reports specifically referred to the inability to verify the stock valuation figures. Thus, as regards the Top 20 audit firms, it would appear that, to a large extent, the introduction of the small company audit qualification merely formalised existing practice. The almost three-fold increase between 1979 and 1982 in the number of audit qualifications received by companies audited by small audit practices indicates that these auditors appear more willing to use the Example 6 provisions to qualify their clients' accounts than the incidence of previous types of audit qualification would have suggested. Whether this trend has continued throughout the 1980s is an interesting point which a future, and more extensive, study would be able to determine.

Multivariate Results

The univariate results indicate that receipt of a small firm audit qualification is partly conditional on whether the company received a qualification in a prior year. This strongly suggests that there may be two distinct phenomena which need addressing. First, which factors explain receipt of a small company audit qualification? Second, which factors account for the receipt of a 'non-recurring' or 'one-off' qualification? To analyse the first issue we

Table 4
Multivariate Results (All Variables Entered)

Variable	Section A Excluding Prior Year Qualification		Section B Including Prior Year Qualification	
	Coefficient	Standard Error	Coefficient	Standard Error
X ₁ No. of Directors	-0.187	2.03**	-0.162	1.51
X ₂ Non-Directors	-0.414	2.92***	-0.376	2.62***
X ₃ Audit Lag	0.063	2.51***	0.057	2.25**
X ₄ Total Assets	0.005	0.81	0.002	1.02
X ₅ % Loans	-0.112	0.20	0.298	0.50
X ₆ Change in Loans	-0.553	0.71	-0.670	0.83
X ₇ Change in Profit	-0.763	1.46	-0.915	1.75*
X ₈ Extraordinary Item	-0.132	0.24	-0.038	0.07
X ₉ Secured Loan	0.740	2.66***	0.662	2.29**
X ₁₀ Auditor Size	2.330	8.53***	1.832	6.19***
X ₁₁ Prior Qualification			1.469	5.02***
X ₁₂ Change in Auditor	0.229	0.80	-0.283	0.95
Constant	-2.171	4.41***	-2.438	4.73***

Using the log-likelihood ratio test, both functions are significant at 0.01 levels of confidence.
Note:
* = significant at 0.1 level of confidence.
** = significant at 0.05 level of confidence.
*** = significant at 0.01 level of confidence.

have not included receipt of a prior year qualification (X₁₁) as an independent variable. To analyse the second issue we have included a prior year qualification as an independent variable.

Section A of Table 4 indicates that the coefficients on the auditor size, secured loan, audit lag and the number of non-director member variables are statistically significant at 0.01 confidence levels and that the number of directors variable is significant at 0.05 confidence levels. The only real difference between the multivariate and univariate results is the statistical significance, at 0.05 levels of confidence, of the number of directors variable. Section B of Table 4, however, indicates that this statistical significance disappears when the prior year qualification is included as an explanatory variable.

The inclusion of the prior year qualification has only one other noticeable effect upon the model, namely that the negative coefficient on the change in disposable profits variable becomes significant at 0.1 levels of confidence.

Because of some collinearity among the independent variables, two stepwise logit regressions were also estimated. Table 5 presents stepwise results⁸ for a model excluding a prior year qualification and a model including a prior year qualification. These results directly reinforce those obtained for the direct logit regressions.

⁸A probability of 10% was used to control the entry of variables in the stepwise process.

Discussion and conclusions

Recent developments in financial institutions and statutory requirements have opened up the role of the auditor to critical scrutiny. The off-balance sheet activities of city firms, the Insolvency Act and the Financial Services Act of 1986, the Government's proposed implementation (DTI, 1986) of the EC's Eight Company Law Directive concerned with the 'Regulation of Auditors', all look certain to have profound consequences for current audit practice.

At the same time, however, the Government appears to view the small firm sector as a major source of new employment opportunities and views existing financial reporting and auditing requirements and other administrative 'burdens' as a major obstacle to the achievement of this objective (DTI, 1985a, 1985b). Thus, clear benefits to one or more important user groups will seemingly have to be established if the current audit requirement for small companies is to continue.

The results presented in the previous section clearly indicate that the distribution of Example 6 qualifications was far from random. Only a minority of small company audit reports (21% for the present sample) actually received the small company qualification. Nevertheless, there appeared to be a clear trend for this type of audit qualification to become progressively more common over the three-year period after its introduction, particularly among companies audited by small audit practices.

Table 5
Multivariate Results (Stepwise Model)

Variable	Section A Excluding Prior Year Qualification		Section B Including Prior Year Qualification	
	Coefficient	Standard Error	Coefficient	Standard Error
X_1 No. of Directors	-0.179	1.74*		
X_2 Non-Directors	-0.413	2.92***	-0.374	2.61***
X_3 Audit Lag	0.058	2.15**	0.061	2.41**
X_4 Total Assets				
X_5 % Loans				
X_6 Change in Loans				
X_7 Change in Profits			-0.898	1.79*
X_8 Extraordinary Item				
X_9 Secured Loan	0.743	2.77***	0.629	2.29**
X_{10} Auditor Size	2.351	8.81***	1.771	6.31***
X_{11} Prior Qualification			1.453	5.04***
X_{12} Change in Auditor				
Constant	-2.156	5.13***	-2.803	8.36***

Using the log-likelihood ratio test, both functions are significant at 0.01 levels of confidence.
Note:
* = significant at 0.1 level of confidence.
** = significant at 0.05 level of confidence.
*** = significant at 0.01 level of confidence

A number of factors appear to be important (i.e. statistically significant) in explaining which companies are most likely to receive a small company audit qualification. For the present sample of small companies operating in the North-East of England over the period 1980 to 1982, the likelihood of receiving a qualified audit report was significantly greater if the company had:

- (i) been audited by a large firm of accountants,
- (ii) few directors,
- (iii) few non-director shareholders,
- (iv) a secured loan,
- (v) a long lag between the accounting year end and the signing of the audited accounts.

The results also indicate that, once a qualification has been received, a further qualification is more likely the following year. Moreover, the statistical significance and negative sign of the change in the disposable profit variable provides some weak evidence that the auditors of companies with declining earnings are more likely to issue such non-recurring qualifications.

Overall, the results would seem to indicate that, unless they were aware of the influence of the above variables upon the issuing of the audit qualification, small company account users would have great difficulty in interpreting its meaning.

The positive auditor effect appears to be of primary importance and is strong enough to warrant further research to disentangle the reason, or reasons, for its presence. Further work could at-

tempt to discover how much of the non-uniformity is due to natural circumstances, differences in technical competencies or differences in attitudes towards professional standards and independence. Only after the above issues are settled can one realistically assess whether it would be more efficient in a social welfare sense to attempt to impose greater uniformity in the supply of audit services or to reduce the audit requirements for small companies.

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Financial Accountability & Management

Summer 1988

Editor: John Perrin

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Risk Perceptions of Financial Analysts and the Use of Market and Accounting Data

Ross Mear and Michael Firth*

Abstract—This paper reports the results of a laboratory experiment which attempts to test the relevance of accounting information and other market-related information in a risk-assessment task. Using the Brunswick lens model framework, estimates of *ex ante* risk on thirty stocks were regressed against nine company-specific cues and one industry variable. The results provide substantial evidence that publically available accounting and financial data convey information relevant for security risk evaluation.

An important dimension of corporate financial reports is their usefulness for stock market investment decisions. The two major components of the investment decision involve assessments of expected return and expected risk, and financial accounts may be helpful in predicting these.

At the aggregate level it has been demonstrated, from the work of Ball and Brown (1968) onwards, that earnings figures and corporate reports have some incremental information content such that stock prices react to their disclosure. It is extremely difficult, however, for this type of research approach to identify which items within an annual report are 'responsible' for the changes in stock price or the changes in investment risk. There are a multitude of items appearing in financial statements and their individual associations with stock price/risk changes are impossible to delineate.

The purpose of the paper is to report the results of an experimental study which derived a subjective measure of risk for each of 30 hypothetical securities and which examined the association between accounting data and these measures of risk. The risk measure of an individual security is obtained by calculating the equally weighted mean of subjective risk assessments made by thirty eight investment professionals. The paper is organised as follows. Firstly, we briefly examine the concept of investment risk and describe the use of investment professionals' risk perceptions. Next, the research method used in the study is introduced and the results are reported in the following section. The final section involves a discussion of the results together with the conclusions.

Investment risk

It is generally accepted that risk is an important dimension of investment decision taking and that investors are risk averse. Further, it is widely recognised that investment return is linked to the level of risk borne. There is also a consensus that risk may be regarded as the level of uncertainty or unpredictability of future investment returns. However, notwithstanding the above, there is considerable disagreement about how risk should be measured and, therefore, how it can be predicted.

In academic circles, the Capital Asset Pricing Model (CAPM) has been the dominant valuation model for the last 20 years. The CAPM holds that the appropriate risk measure is systematic risk (Beta) and that the risk premium for a particular stock is a function of that security's Beta and the difference between the expected market rate of return and the risk free rate of return. In a practical sense Beta is measured *ex post* and thus is only an estimate of *ex ante* risk (risk being an *ex ante* concept). The use of Beta has also spread to investment advisory agencies who calculate and sell Betas, and to investment managers who utilise Betas in building investment portfolios.

Recently, however, there has been a growing disenchantment with the usefulness of Beta and this is shared by academics and practitioners alike. Academics are concerned by both the theoretical underpinnings of the CAPM and the empirical measurement of Beta (Roll, 1977). Practitioners and others have attempted to improve the measurement of Beta by incorporating various accounting variables along with historical Betas, in order better to estimate future Betas (Rosenberg and McKibben, 1973; Sharpe, 1985). Despite this search for improving the measurement of Beta, it appears that its usefulness to investment profes-

*The authors thank the reviewers for helpful comments on an earlier draft.

sionals has reached a plateau and that investors are looking elsewhere for measures, or additional measures, of risk.

One alternative to Beta as a measure of risk is the use of the subjective risk perceptions of investment professionals. This measure of risk can be operationalised by taking a linear average of the subjective risk perceptions of a group of investment advisors and portfolio managers (i.e. the 'professionals'). In some ways this method of deriving risk estimates is similar to the assessments made by Moodies, Standard and Poors, and others, in grading bonds, and to assessments made by investment committees/teams who evaluate investments. Farrelly and Reichenstein (1984) regard this subjective perceived risk measure as being an *ex ante* measure in that it is forward looking; this contrasts with the objective, but *ex post*, measure of Beta.

Measures of perceived risk have been used in a number of studies (e.g. Gooding, 1975; McDonald and Stehl, 1975; Crum, Laughunn and Payne, 1981; Farrelly and Reichenstein, 1984; and Farrelly, Ferris, and Reichenstein, 1985). Farrelly, Ferris, and Reichenstein (FFR) examined whether various accounting variables, contained within annual financial statements, could be used to 'explain' the perceived risk. In this sense they were attempting to determine whether accounting data is useful for predicting stock market risk. Their research was therefore similar to that of Beaver, Kettler and Scholes (1970), and others (e.g. Rosenberg and McKibben, 1973; Eskew, 1979) who sought to explain the Beta measure of investment risk by use of accounting variables. The results reported in FFR provide evidence consistent with the hypothesis that financial reports convey, at least in an implicit fashion, information on risk. In particular they found that leverage, variability in earnings, and the current ratio, were significantly associated (at the 0.05 level) with perceived risk. However, as indicated in their study, FFR provide only an indirect test of the relevance of accounting information for risk assessment: only the company names, and no accounting data, were supplied to the recipients of their questionnaire. Thus, they could not determine whether the financial analysts in their sample actually used the accounting measures in formulating their risk judgments or whether the risk perceptions and the accounting data jointly reflect the same underlying events. FFR conclude that:

A desirable follow-up study would have respondents assess risk on the basis of accounting risk measures only—that is, without the names of companies. This would provide a direct test for the relevance of accounting information in assessing risk.

Accordingly, this paper reports the results of a

laboratory experiment which attempts directly to test the relevance of accounting information and other market related information in a risk assessment task.

Research method

The research method used in this study involved a standard application of the Brunswick lens model (1956) to a hypothetical investment scenario. The experimental task required subjects to provide an assessment of the risk contribution of an individual security to a well diversified client portfolio. Subjects were instructed to record their risk evaluations on a discrete 9 point scale (1 = 'riskless', 9 = 'extremely risky') conditional on the value of nine company-specific cues and one industry variable. Considerable care was taken in developing and constructing the experimental stimulus set. Interviews with financial analysts, surveys of stockbroker investment publications, and searches of the business and academic literature were made in order to create more realism in the experimental design. The final selection of stimuli was facilitated by an orthogonal factor analysis and pre-tested in a sample study. The nine preselected cues were net assets, proprietorship ratio, liquid ratio, sales growth, dividend cover, profitability, valuation ratio, systematic risk (Beta) and variance of returns.

FFR (1985) also included measures of dividend cover, liquidity, size, growth, and proprietorship in their study. In contrast to FFR, however, we felt compelled to include market determined measures of risk (Beta, Variance of Returns) in the independent variable set. Both the academic literature and our discussions with investment professionals suggested the inclusion of these market determined variables. By allowing the inclusion of Beta and Variance of Returns we are able to see if accounting based measures of risk have any incremental explanatory power in the modelling of risk. Market-wide indicators and expected industry results were also provided to simulate a more realistic setting for the usage of the company specific cues.

Table 1 shows the correlations between the variables. The correlations were fairly low in most cases, with only six being significantly related at the 0.05 level. Multicollinearity does not, therefore, appear to be a major problem in our study.

The subjects were 38 professional security analysts and portfolio managers working at various financial institutions throughout New Zealand. An analysis of subject biographical profiles indicated that the subjects were mature individuals with substantial experience in investment advice/appraisal. Each subject evaluated 30 financial profiles (consisting of the aforementioned ten variables) of hypothetical companies. The evalu-

ations were made during a controlled experimental setting.¹

The subjects were asked to assume that a well known client had approached them with a proposed equity investment and they (the subject) were requested to make an estimate of the expected risk (measured on a nine point scale) on the security over a one year holding period. The client is specified as holding a well diversified, equally weighted portfolio and the value of the proposed investment will be equal to that of the other individual securities.

The mean of the 38 subjects' judgments of the riskiness of hypothetical company 1 was used as the composite risk for that case. An identical procedure was used in obtaining composite risks for each of the other 29 cases.

Results

Table 2 shows the results of regressing the vector of mean risk scores on the six accounting variables (net assets, proprietorship ratio, liquidity, sales growth, dividend cover, profitability). The accounting variables explained approximately 80 percent (adjusted R-squared = 0.75, $F = 15.761$, $p < 0.0001$) of the variation in the mean risk perceptions of the financial analysts. This compares with an adjusted R^2 of 66 percent reported in the FFR study (which regressed the mean risk perceptions against seven accounting variables). In contrast to FFR's research, the risk evaluations in our study were predicated on the accounting and financial variables. Three variables were statistically significant at the 0.05 level: net assets, proprietorship ratio and profitability.

Table 3 shows the regression results where market determined measures of risk (Beta, Variance of Returns) were added.² At an aggregate level, the experimental stimuli explained approximately 93 percent (adjusted R-squared = 0.90, $F = 25.81$, $p < 0.0001$) of the variation in the mean risk perceptions of the financial analysts; see regression one. Furthermore, seven variables are significant at the $\alpha = 0.05$ level (net assets, proprietorship ratio, liquid ratio, industry, profitability, Beta and variance of returns) and sales growth is significant at the $\alpha = 0.10$ level. Of interest, here, is the fact that accounting measures as well as

market-determined measures were significant variables in explaining the risk scores. This confirms our *a priori* assumptions as to the importance of market measures in explaining perceptions of investment risk. These results provide considerable support for the notion that publicly available information does convey, at least in an implicit fashion, information relevant for security risk assessment.

To investigate the sensitivity of the composite risk model to alternative specifications of the dependent variable, three additional analyses were undertaken. First, to identify the impact of outliers on the estimated regression model the analysis was repeated dropping the two observations with the highest sampled variance in analyst risk perceptions (regression 2). Second, to investigate the effects of possible measurement errors in the dependent variable induced by inconsistencies in analyst risk perceptions, the dependent variable was transformed to reflect the extent to which the variance in each analyst's risk perceptions was explained by the variance in the explanatory variable set. Thus each analyst's risk perceptions were weighted by the coefficient of determination in their individual judgment model and these adjusted risk scores were then averaged across all analysts to construct the new dependent variable³ (regression 3). Third, to investigate the sample specificity of the estimated regression model, the original regression was replicated on five separate sub-samples of the response data (regressions 4 to 8). In each of these sub-samples the new dependent variable represented the average risk perception of a random sample of 25 analysts' risk assessments selected without replacement.

The results of the additional analyses are reported in rows 2, 3, and 4-8 respectively of Table 1. A comparison of the magnitudes, signs and statistical significance of the estimated regression coefficients in Table 1 suggests that the original regression model is insensitive to alternative specifications of the dependent variable. In particular, the results reported for net assets, proprietorship ratio, liquid ratio, dividend cover, industry, profitability, valuation ratio, and variance of returns are highly consistent across the eight regression models. In contrast, the statistical significance of the sales growth variable and the magnitude and statistical significance of the coefficient on Beta appear to be somewhat sample dependent.

¹Thirty subjects undertook the experiment during a one afternoon session at a conference organised by the New Zealand Society of Investment Analysts. The other eight subjects undertook the task during a one afternoon session in the boardroom of a major stockbroking firm.

²Regressions were also conducted using only market measures of risk and two financial variables (valuation ratio and industry), as independent variables. This regression resulted in an R square of 0.53 with only variance of return being significant ($p < 0.001$). No other variable was significant, even at the 0.10 level.

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³The mean (median) R-squared for the individual analyst risk perception models was 0.73 (0.74). A comparison of these coefficients of determination with the R-squared = 0.931 for the composite risk model indicates that the latter represents a simple and effective method of reducing, or eliminating, the inconsistency inherent in the individual analyst models.

Table 1
Correlations Between Variables

	Net Assets	Proprietorship Ratio	Liquid Ratio	Sales Growth	Dividend Cover	Industry	Profitability	Valuation Ratio	Beta	Variance of Returns
Net Assets	1.00 (0.00)	0.11 (0.57)	0.02 (0.91)	-0.01 (0.97)	-0.08 (0.64)	-0.05 (0.78)	-0.19 (0.30)	-0.15 (0.43)	0.08 (0.67)	-0.28 (0.12)
Proprietorship Ratio		1.00 (0.00)	0.36 (0.06)	-0.11 (0.57)	0.08 (0.69)	0.01 (0.97)	-0.21 (0.27)	-0.21 (0.27)	-0.19 (0.31)	-0.41 (0.04)
Liquid Ratio			1.00 (0.00)	-0.27 (0.16)	0.09 (0.63)	-0.16 (0.41)	0.02 (0.90)	0.10 (0.59)	-0.01 (0.97)	-0.11 (0.57)
Sales Growth				1.00 (0.00)	-0.24 (0.19)	0.09 (0.62)	0.04 (0.83)	0.07 (0.69)	-0.02 (0.93)	0.10 (0.59)
Dividend Cover					1.00 (0.00)	0.37 (0.05)	0.40 (0.03)	0.12 (0.53)	0.28 (0.13)	0.03 (0.88)
Industry						1.00 (0.00)	0.45 (0.01)	0.33 (0.08)	-0.03 (0.88)	-0.27 (0.14)
Profitability							1.00 (0.00)	0.34 (0.06)	-0.02 (0.91)	-0.17 (0.37)
Valuation Ratio								1.00 (0.00)	-0.10 (0.61)	-0.01 (0.96)
Beta									1.00 (0.00)	0.48 (0.01)
Variance of Returns										1.00 (0.00)

Significance levels are presented in parentheses below the correlation coefficients.

Table 2
Regression Results for the Accounting Variables

Net Assets	Proprietorship Ratio	Liquid Ratio	Sales Growth	Dividend Cover	Profitability	R ²	Adjusted R ²	F Value
-0.009 (0.0005)	-0.064 (0.0001)	-0.354 (0.2206)	-0.003 (0.6275)	0.128 (0.2740)	-0.051 (0.0013)	0.804	0.753	15.761

Significance levels are presented in parentheses below the regression coefficients.

Table 3
Regression Analysis Results
Independent Variables

Regression Number	Dependent Variable	Net Assets	Proprietorship Ratio	Liquid Ratio	Sales Growth	Dividend Cover	Industry	Profitability	Valuation Ratio	Beta	Variance Return	Adjusted R ²	R ²	F Value
1	Mean Risk Perception (M = 30) (N = 38)	-0.009 (0.0001)	-0.051 (0.0001)	-0.411 (0.048)	-0.007 (0.078)	-0.039 (0.694)	0.114 (0.017)	-0.060 (0.012)	0.194 (0.289)	0.477 (0.018)	0.010 (0.033)	0.931	0.896	25.831
2	Mean Risk Perception (M = 28) (N = 38)	-0.008 (0.0003)	-0.050 (0.0001)	-0.441 (0.30)	-0.007 (0.079)	-0.157 (0.158)	0.07 (0.091)	-0.040 (0.102)	0.125 (0.473)	0.769 (0.004)	0.010 (0.028)	0.938	0.902	25.983
3	Weighted Risk Perception (M = 30) (N = 38)	-0.006 (0.0001)	-0.035 (0.0001)	-0.279 (0.055)	-0.005 (0.080)	-0.033 (0.638)	0.085 (0.011)	-0.061 (0.15)	0.114 (0.372)	0.461 (0.002)	0.007 (0.032)	0.935	0.902	27.560
4	Replication 1 (M = 30) (N = 25)	-0.008 (0.0007)	-0.051 (0.0001)	-0.470 (0.038)	-0.004 (0.307)	-0.063 (0.559)	0.122 (0.017)	-0.064 (0.013)	0.209 (0.292)	0.601 (0.007)	0.009 (0.070)	0.923	0.883	22.843
5	Replication 2 (M = 30) (N = 25)	-0.008 (0.0001)	-0.054 (0.0001)	-0.407 (0.042)	-0.006 (0.091)	-0.078 (0.415)	0.120 (0.009)	-0.047 (0.035)	0.092 (0.596)	0.246 (0.179)	0.010 (0.024)	0.936	0.901	27.515
6	Replication 3 (M = 30) (N = 25)	-0.008 (0.0006)	-0.047 (0.0001)	-0.475 (0.048)	-0.005 (0.218)	-0.027 (0.812)	0.102 (0.056)	-0.063 (0.019)	0.254 (0.231)	0.175 (0.422)	0.010 (0.055)	0.900	0.848	17.114
7	Replication 4 (M = 30) (N = 25)	-0.009 (0.0002)	-0.043 (0.0001)	-0.271 (0.184)	-0.009 (0.019)	-0.086 (0.395)	0.139 (0.005)	-0.52 (0.27)	0.102 (0.579)	0.551 (0.008)	0.012 (0.011)	0.923	0.886	23.584
8	Replication 5 (M = 30) (N = 25)	-0.009 (0.0001)	-0.051 (0.0001)	-0.586 (0.014)	-0.008 (0.060)	0.018 (0.875)	0.110 (0.033)	-0.075 (0.006)	0.313 (0.132)	0.430 (0.051)	0.006 (0.056)	0.913	0.867	19.947

M = number of companies; N = number of analysts; significance levels are presented in parenthesis below the regression coefficients.

Discussion and conclusions

The interrelated questions of what constitutes risk, how it should be measured and whether accounting information is supportive of financial analyst risk assessments, constitute largely unresolved issues in accounting research. By choosing to measure the concept of ex ante risk empirically, FFR adopted a fundamentally different and promising approach to these unresolved issues. However, insofar as the respondents in their study were only supplied with company names, FFR are unable to establish any direct relationship between accounting information and their empirical surrogate for ex ante risk. The reported relationships are at best empirical associations and the question as to whether financial analysts actually use accounting information in formulating their ex ante risk assessments is left largely unanswered.

This study attempted to extend the work of FFR by providing a direct test of the relevance of accounting information for risk assessment. Although differences in experimental design prohibit a direct comparison of research findings, the results reported here are generally consistent with the conclusions reported in FFR. Accounting reports do appear to convey, at least in an implicit fashion, information relevant for the assessment of ex ante risk. Furthermore the estimated relationship between accounting risk measures and financial analyst risk perceptions appears to be relatively robust to the problem of outliers and to a variety of alternative empirical specifications of ex ante risk.

Perhaps one final comment is in order. In attempting to explain the cross-sectional variation in analysts' risk perceptions, FFR focused solely on accounting-determined measures of risk. Discussion with financial analysts and the desire for a realistic experimental task forced us to include market-determined measures of risk in addition to accounting risk indicators. The statistical

significance of the coefficient on variance of returns (and to a lesser extent Beta) in the estimated composite risk model provides evidence on the importance of market-related variables on financial analysts' risk assessments. This suggests that future research directed at explaining variations in financial analyst risk perceptions should include both accounting and market related measures of risk.

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An Empirical Study of the Adoption of Sophisticated Capital Budgeting Practices and Decision-Making Effectiveness*

Richard H. Pike

Abstract—This paper examines the trend towards greater sophistication in investment selection techniques and control processes, and their impact on capital budgeting decision effectiveness. Based on a sample of 100 large UK firms, the study examines the capital budgeting practices employed over an 11-year period. Very significant increases in the uptake of sophisticated investment methods are reported, particularly in the analysis of project risk. These developments are partly explained by the rapid developments in computing within capital budgeting. Clear evidence is found to suggest that senior finance executives believe that the adoption of sophisticated investment practices gives rise to improved effectiveness in the evaluation and control of large capital projects.

Introduction

The effectiveness of the capital budgeting process and its associated methods of financial analysis within an organisation depends ultimately upon how it influences the behaviour of managers in allocating scarce resources among competing investment alternatives. Companies employing *sophisticated* capital budgeting techniques and controls (such as net present value, probability analysis and post-completion audits) should, theoretically, be more effective in capital investment decision-making than those employing *naïve* methods (such as the payback period) with little in the way of control mechanisms.

The purpose of this study is to examine the trend towards greater sophistication in investment selection techniques and control processes, and the perceived impact on capital budgeting effectiveness. If one objective of accounting theory is to explain and predict accounting practice (Watts and Zimmerman, 1986; Kinney, 1986) then this study, which seeks to establish a small part of how the world works, is justified.

Previous research

The trend towards greater sophistication in capital investment selection techniques is well documented

for both the US (Klammer, 1972; Sundem and Geijsbeek, 1978; Scapens and Sale, 1981; and Moore and Reichert, 1983) and the UK (Rockley, 1973; Carsberg and Hope, 1976; Westwick and Shohet, 1976; Scapens and Sale, 1981; Pike, 1983a). While each survey has made its own distinctive contribution to the literature and our understanding of investment practices, collectively they offer only a very limited, and frequently distorted picture of the state of the art. Generalisations based on survey comparisons must always be questioned. Firstly, the surveys from which the data were drawn are so dissimilar that they do not permit comparison and, secondly, the use of mailed questionnaire surveys means that survey results are distorted by non-response bias. Rappaport (1979) launched the following attack in this regard:

Authors, editors and referees generally have not fulfilled their responsibility in producing quality work on capital budgeting use rates. Nor have authors taken the risks involved proving unaccustomed methodologies such as those followed by psychologists, or studying industries for insights into reason for non use (p. 102).

Very few surveys (Klammer, 1972; Hoskins and Dunn, 1974; Robichek and MacDonald, 1966) have sought to assess how investment practices within the same sample of firms change over time. However, even these surveys have their limitations in that they require respondents to state practices employed up to 15 years previously, thus giving rise to significant errors of recall.

*The author is indebted to the Chartered Institute of Management Accountants for its generous funding of this study and to the helpful comments of two unnamed referees. Assistance by M. Wolfe is also acknowledged.

A notable feature of recent years has been the general availability of financial modelling packages and specific capital investment computer models.¹ Most of these systems include sophisticated selection techniques as standard features, rendering the marginal cost of producing certain additional information very small. Firms operating within competitive environments might reasonably be expected to adopt such new methods wherever they offer some additional insight or precision over and above more traditional methods. The so called 'gap' between conventional text-book theory and practice should therefore have narrowed considerably over the past decade if 'theoretical' methods possess utility to practitioners.

A second strand of the capital budgeting literature of relevance to this study relates to the attempts to determine whether there is any relationship between the use of sophisticated selection techniques and firm performance (Christy, 1966; Klammer, 1973; Sundem, 1974; Kim, 1982; Pike, 1984; Haka *et al.*, 1985). Although the evidence is somewhat mixed, very little reliable evidence is offered supporting the notion that sophisticated selection methods produce superior returns.

The most recent study (Haka *et al.*, 1985) observes that earlier empirical studies assessing the effect of using sophisticated versus naive capital budgeting selection techniques have suffered from numerous theoretical, statistical and data collection problems. The study attempts to correct for some of these limitations by conducting interrupted time-series tests of relative market returns on firms that adopted sophisticated techniques versus a control group of firms employing naive methods. It, like many prior studies, found no support for the notion that superior investment techniques give rise to superior performance. However, as the authors point out, this study has its own shortcomings. First, a very narrow definition of sophisticated techniques was employed, and second, the small sample size and the fact that firms were not randomly selected render any interpretation beyond the small sample questionable.

Perhaps we have in the past hoped for too much. Level of sophistication in capital budgeting is one of any number of factors which may contribute to superior firm performance; and it is questionable whether any experiment could adequately control for every potential confounding effect.

This somewhat more modest study addresses two research questions:

- (1) What evidence is there that the rate of adoption of sophisticated capital budgeting meth-

ods in large UK firms is increasing, and

- (2) What evidence is there to suggest that adoption of such sophisticated methods gives rise to greater effectiveness in evaluating and controlling projects? No attempt is made to identify whether such greater effectiveness, in turn, gives rise to superior corporate performance.

Survey

A questionnaire was designed to establish the capital budgeting controls, selection techniques, objectives and constraints within large UK firms. Questions were framed in three different ways:

- (i) 'factual' questions requiring a dichotomous (Yes/No) response;
- (ii) questions seeking assessments of regularity of use, on a five-point scale ranging from 'Never' to 'Always'; and
- (iii) attitudinal questions seeking the respondent's assessment of the degree of importance (from 'very' to 'not at all').

The survey was conducted at two points in time. In 1980 a survey was conducted on the 208 largest UK quoted companies (measured in terms of market capitalisation).² The questionnaire was addressed to the financial director in each organisation. Respondents were requested to indicate current practices and those in use five years earlier. During 1986 the same survey was distributed to the 150 firms participating in the 1980 survey. Between the two surveys ten organisations were lost from the sample as a result of amalgamations and liquidations, giving rise to the following samples and response rates:

	1980	1986
Sample firms	208	140
Usable responses	150	100
Response rate	72.1%	71.4%

In both years the usable response rate achieved was in the region of 72 percent, well above that of any prior mailed capital budgeting survey. To ensure comparability, this study was restricted to examining the investment practices on the same 100 firms in 1975, 1980 and 1986. Although the high response rate suggests that non-response bias should not be a major problem, this was confirmed by the following tests:

- (i) Non-respondents were asked to state why they did not participate in the survey. The main reasons were 'lack of time' and 'company policy'.

¹See Grinyer (1983) and Higgins and Opdebeek (1984) for a discussion of this.

²The survey was conducted at the end of 1980 and beginning of 1981. Results are stated as 1981.

- (ii) Comparison was made between the usage rates in 1980 based on the original sample of 150 firms and the restricted sample of 100 firms. No significant differences in usage were found between the samples.
- (iii) The ten firms lost from the original sample through liquidation and merger did not exhibit any obvious differences in capital budgeting practices.

Follow-up interviews were conducted in five firms to confirm the reliability of the questionnaire.

Although the survey specifically excluded smaller-sized firms, the annual capital expenditure of responding organisations varied widely, but changed little between 1980 and 1986.

Size of Capital Budget (1986) £ million	Number of Firms
Below 5	24
5 to 25	23
25 to 50	21
50 plus	32
	<u>100</u>

The distribution between the stock exchange classes proved to be relatively evenly spread, with the exception of the wide Capital Goods definition which covers about one-third of the firms:-

Sector	Number of Firms
Capital Goods	34
Consumer Durables	10
Food and Drink	18
Retail and Stores	16
Oil and Chemicals	13
Other	9
	<u>100</u>

Survey results

Pre-Decision Controls

The capital budgeting process as a whole can be viewed as a control process. Scapens, Sale and Tikkas (1982) classify the capital budgeting control process in terms of pre-decision and post-decision controls. Pre-decision controls are mechanisms which are inputs to the decision process designed to influence managerial behaviour. Examples of such controls include the selection and training of subordinates with similar goals and risk attitudes (Itami, 1975), setting authorisation levels and procedures to be followed (intervention control strategy), and influencing the proposals submitted by setting goals, hurdle rates, cash limits, and identifying strategic areas for growth (influencing control strategy).

The survey asked eight questions to assess the degree to which pre-decision controls are in use in larger firms. Summarised responses are given in Table 1 and the more important findings discussed below.

Capital Budgets

Almost two-thirds of the sample prepare a capital budget which looks beyond two years. The trend towards adoption of longer-term capital budgets has halted since 1981, indicating that a level of stability has been reached among large UK firms. It would seem that there is still insufficient confidence in longer-term economic forecasts to encourage the remaining firms to increase their planning horizon. Size (measured by level of annual capital expenditure) is a significant factor in the use or non-use of longer-term capital budgets.

Table 1
Capital Budgeting Control Procedures within 100 Large UK Firms

	1986	1981	1975
	%	%	%
<i>Pre-Decision Controls</i>			
Firms with:			
Capital budget looking beyond two years	64*	64*	57*
An up-to-date capital budgeting manual	84	76*	65*
A formal screening and reviewing body	83	84	78
At least one person fully engaged in capital budgeting	26*	33*	31*
A specific search and screening of alternatives	98	84	76
A regular review of hurdle rates	71	61	43
A formal financial evaluation	100	95	93
A formal analysis of risk	86*	38*	26*
<i>Post-Decision Controls</i>			
Firms which:			
Monitor project performance	84	76	69
Reconsider major projects after approval if cost over runs are likely	85	82	72
Require post-completion audits on most major projects	64	46	33

* Size significant at 5% level using chi-square test.

Investment Manuals

The most obvious way of influencing managerial investment behaviour is by formalising the pre-decision control procedures in the form of an up-to-date capital budgeting manual, or equivalent. Table 1 reveals that 84 percent of responding firms operate such a manual: an overall increase of 19 percentage points since 1975. Non-users are exclusively the smaller organisations within the sample.

Capital Budgeting Personnel

The only downward trend observed relates to the use of specialist capital budgeting staff. With only 26 percent of firms employing such personnel, this suggests that capital budgeting is not generally regarded as a specialist function (as for example taxation or treasury management is frequently viewed). Investment is the responsibility of every manager and does not require a separate function. However, larger firms often require someone to co-ordinate the investment process, and the majority of firms investing over £50 million each year employ such a specialist.

Hurdle Rates

Increasing attention is devoted to setting and reviewing investment hurdle rates: 71 percent of firms review these levels on a regular basis compared with 43 percent in 1975.

The survey asked respondents to indicate within a specified range the hurdle rate required for normal-risk projects, after tax and in monetary terms. The findings show the modal range to be 15–19 percent with approximately two-thirds of firms employing rates between 15 and 24 percent. This position has changed very little in total from that found in 1981. With government securities at the time of the 1986 survey yielding around 8 percent, it would seem that a risk premium of between 7 and 16 percent is being added by the majority of firms for typical-risk investment projects.

Closer analysis of the findings, however, shows a definite increase in hurdle rates for larger firms (investing in excess of £25 million annually) and a downward shift in rates for the smaller firms compared with their 1981 positions leading to greater uniformity between larger and smaller firms. It is particularly puzzling as to why over a period when inflation rates and interest rates have fallen considerably, hurdle rates for larger firms should actually increase.

To examine this and other issues in greater depth a follow-up survey was conducted amongst the one hundred respondents to the initial questionnaire. We asked respondents, whose typical hurdle rates fell outside the 15–19 percent band, to suggest why this might be so. For those firms setting rates of 20

percent and above the most commonly held arguments were the suspected optimism in cash flow forecasts, the adjustment for 'non-earning' projects, and the high risk of the business.

They were also asked to assess the effect of high hurdle rates on the generation of proposals. Although some organisations did not regard it as having any serious impact, the majority of respondents recognised that it reduced the number of proposals put forward. For example:

Proposals are not submitted if they do not satisfy the required rate of return.

Projects rarely come forward with returns below the threshold.

It clearly limits the number of proposals put forward.

From the above discussion it would seem that, in an effort to mitigate the effects of biased forecasting and non-economic investment, some firms may be guilty of killing off potentially sound projects by setting unrealistically high hurdle rates.

Risk Analysis

The dramatic increase in the extent to which firms formally analyse project risk (from 26 percent in 1975 to 86 percent in 1986) is, perhaps, the most interesting finding from the entire study. Risk analysis is not simply conducted on the occasional project: approximately one-half of the respondents conduct risk analysis, in some form, on most projects. We shall return to this subject later.

Post-Decision Controls

While not directly influencing the decision outcome, post-decision investment control mechanisms can influence both the investment performance (implementation controls) and the quality of future investment decisions (feedback). Table 1 summarises the trend in these capital budgeting control procedures. The most notable increase is the requirement to conduct post-completion audits. Although a common feature in North America, post-audits have hitherto been little used in the UK. The study reveals that since 1975 there has been a marked increase in adoption with 54 percent now regularly conducting audits on larger capital investment projects. The main justifications given by respondents for their use are: (1) ensuring accountability of managers in an attempt to deter over-optimistic forecasts, and (2) learning from the investment experience to improve the quality of future decisions.

Capital Budgeting Techniques

Table 2 summarises the capital investment evaluation techniques employed by responding companies between 1975 and 1985. Table 3 anal-

Table 2
Capital Investment Evaluation Methods: Trend Analysis of Usage in 100 Large UK Firms

	1986	1981	1975
	%	%	%
Firms using:			
<i>Financial Appraisal Techniques</i>			
Payback	92	81	73
Average accounting rate of return	56—	49	51
DCF methods (IRR or NPV)	84	68	58
Internal rate of return	75+	57	44
Net present value	68+	39	32
<i>Risk Analysis Techniques</i>			
Sensitivity analysis	71+	42	28
Analysis under different assumptions (best/worst)	93+	n.a.	n.a.
Reduced payback periods	61	30	25
Increased hurdle rates	61+	41	37
Probability analysis	40	10	9
Beta analysis	16+	0	0
<i>Management Science Techniques</i>			
Mathematical programming	21+	17	11
Computer simulation	40+	21	12
Decision theory	34+	3	3
Critical path analysis	49	31	23
<i>Inflation Treatment Methods</i>			
Specifying cashflows at constant prices and using a real rate of return	69	39	33
Specifying a general rate for all costs and revenues	58	39	30
Using different rates for costs and revenues	53+	33	23
Considering at the sensitivity or risk analysis stage	44	16	14

+ indicates significant positive association (at 5% level), — indicates a significant negative association with the frequency of use of computer applications in capital budgeting using the Spearman Rank correlation and *t*-tests conducted on 1986 data only.

Table 3
Capital Investment Evaluation Methods: Frequency of Use in 100 Firms
 (The most popular category has been underlined)

	Total	Positive Responses			
	%	Rarely	Often	Mostly	Always
	%	%	%	%	%
Firms using:					
<i>Financial Appraisal Techniques</i>					
Payback	92	5	16	24	<u>47</u>
Average accounting rate of return	56	13	15	10	<u>18</u>
Internal rate of return	75*	9	11	13	<u>42</u>
Net present value	68*	16	15	14	<u>23</u>
<i>Risk Analysis Techniques</i>					
Sensitivity analysis	71	15	<u>23</u>	15	18
Raising required rate of return	61	13	<u>22</u>	20	6
Shortening payback period	61	17	<u>32</u>	10	2
Probability analysis	40*	<u>22</u>	13	2	3
Beta analysis	16	<u>12</u>	2	0	2
<i>Management Science Techniques</i>					
Mathematical programming	21*	<u>12</u>	4	2	3
Computer simulation	40*	<u>21</u>	10	6	3
Decision theory	34*	<u>21</u>	9	1	3
Critical path analysis	49*	<u>17</u>	18	8	6
<i>Inflation Treatment Methods</i>					
Using a real rate of return with constant prices	69	12	14	<u>23</u>	20
Adjust for general inflation	58	15	<u>22</u>	14	7
Using different rates for costs and revenues	53*	10	<u>18</u>	11	14
Analysing at the sensitivity stage	44	14	<u>16</u>	7	7

*size a significant factor at 5% level using chi-square test.

Table 4
Combined Evaluation Methods Used (100 Companies)

	1985/86	1980/81	1975
<i>No Method</i>	0	0	2
<i>Single Method</i>			
PBK	6	12	14
ARR	0	7	12
IRR	2	4	5
NPV	0	1	0
	<u>8</u>	<u>24</u>	<u>31</u>
<i>Two Methods</i>			
PBK + ARR	10	13	14
PBK + IRR	8	14	14
PBK + NPV	5	6	4
ARR + IRR	2	2	0
ARR + NPV	1	1	1
IRR + NPV	3	4	1
	<u>29</u>	<u>40</u>	<u>34</u>
<i>Three Methods</i>			
PBK + ARR + IRR	5	10	7
PBK + ARR + NPV	3	4	4
PBK + IRR + NPV	21	9	10
ARR + IRR + NPV	0	1	1
	<u>29</u>	<u>24</u>	<u>22</u>
<i>Four Methods</i>			
PBK + ARR + IRR + NPV	34	12	11
Total	<u>100%</u>	<u>100%</u>	<u>100%</u>

Key PBK = payback
 ARR = accounting rate of return
 IRR = internal rate of return
 NPV = net present value.

yses the latest survey responses in terms of regularity of use.

Financial Evaluation

While all firms sampled conduct a financial evaluation on capital projects, the particular methods of analysis employed differ widely. DCF techniques, of which the internal rate of return (IRR) and net present value (NPV) methods are the best known, have greatly increased in usage from 58 percent in 1975 to 84 percent in 1986, making it a standard technique for the larger firm. Hitherto the IRR method has enjoyed much greater popularity amongst practitioners than the NPV method, more favoured by academics. However, in recent years there has been a marked acceleration in the adoption of the NPV method, although the IRR is still the dominant partner in terms of regularity, 42 percent of respondents applying it to every investment proposal.

The capital budgeting literature (e.g. Klammer, 1972; Pike, 1983; Haka, 1985) distinguishes between 'naive' and 'sophisticated' methods of investment analysis. Naive methods include payback and accounting rate of return techniques, while

'sophisticated' techniques include most, if not all, of the other methods listed in Table 2. In this paper the definition is broadened to include investment control procedures such as post-completion audits. This study is restricted to large-scale capital projects and as such excludes smaller projects which do not merit sophisticated treatment on grounds of size.

The observed increase in the adoption of sophisticated appraisal techniques has not come at the expense of naive methods. The payback method continues to gain support and is now almost universally employed (92 percent), approximately one-half of the sample using it on every occasion. Prior studies (for example McIntyre and Coulthurst, 1986) have shown it to be highly popular for smaller firms. The obvious conclusion to be drawn is that managers prefer to employ a combination of appraisal methods, sophisticated and naive. This is borne out from the findings reported in Table 4.

Sixty-three percent of firms sampled use three or more evaluation methods, compared with 36 percent in 1981. While only eight percent now use a single method, 79 percent use a combination of naive (payback or accounting rate of return) and sophisticated methods. The continued popularity

of the payback method can be attributed to a variety of factors:

- a proxy for the rate of profit (Gordon, 1955; Mephram, 1975);
- a simple but effective measure of risk (Sundem, 1974; Fremgen, 1973);
- a constraint and break-even concept (Weingartner, 1969);
- a communication device (Weingartner, 1969; Brealey and Myers, 1981);
- a measure for resolving capital rationing (Pike, 1983b);
- a proxy for duration (Boardman, Reinhart and Celec, 1982; Kruschwitz, 1985). and
- the conflict between owners and managers (Statman and Sepe, 1984; Pike, 1985).

It would therefore seem that such a combination of factors makes the much maligned simple payback method an essential managerial decision-making technique for virtually all UK firms.

Risk Analysis and Management Science Techniques

Table 1 revealed that a formal analysis of investment risk is now a standard pre-decision control procedure for almost all firms surveyed. Although the techniques employed in analysing capital projects vary considerably across firms, all have witnessed considerable increases in usage (Table 2).

Clearly, the most popular approach involves testing the sensitivity of critical investment inputs and underlying economic assumptions. The high usage of sensitivity analysis (71 percent) and best/worst case analysis (93 percent) suggests a strong movement towards applying multi-point estimates.

A strong movement towards the application of probability analysis is also witnessed, most notably by the larger firms surveyed. However, of the 40 percent applying probability analysis and the 16 percent using beta analysis, very few operate them on a regular basis (Table 3).

It is relevant to establish the main causes for the dramatic increase in use of risk analysis methods in recent years. The 1981 survey found that non-users believed project risk to be impossible to quantify, and too complex and time consuming. There now seems to be a greater awareness of the value of risk analysis and management science techniques, which may largely be attributed to the availability of relatively inexpensive computer software. With the exception of probability analysis, a significant and positive association was found between the use of all sophisticated risk analysis methods and the application of investment computing software (see Table 2).

Accounting for Inflation

The evidence from previous empirical studies (Carsberg and Hope, 1976; Westwick and Shohet, 1976; Hodder and Riggs, 1985) is somewhat inconclusive as to the extent to which practice adheres to the processes prescribed by academics (for example, Bromwich, 1969; Van Horne, 1971; Schofield, McBain and Bagwell, 1973; Coulthurst, 1986).

Two popular errors were identified by Carsberg and Hope in the mid-seventies:

- (i) comparing the money cost of capital with cash flows expressed in real terms, and
- (ii) applying a general inflation rate rather than specific rates.

Little evidence was found to suggest that these errors are anything like so serious today. Table 3 shows that 69 percent of firms surveyed compare like with like by using a real rate of return in discounting cash flows specified in today's prices. The fact that Carsberg and Hope found no firms in their survey adopting this procedure indicates that the high levels of inflation since their study was conducted have forced firms to re-examine inflation treatment within capital budgeting contexts. Although the use of the general rate of inflation for all project costs and revenues is still practised, the application of the specific rate for inputs is also regularly employed, particularly among larger firms.

Investment sophistication

The results of the survey discussed in the foregoing section indicate a strong increase in the use of sophisticated investment selection and control methods. A more rigorous examination is made in the null hypothesis:

Hypothesis 1: No significant increase in use of sophisticated investment selection techniques and control methods occurred between 1975 and 1986.

This hypothesis is tested by conducting a two sample test of differences between proportions ($p < 0.05$:1 tail) for the 1975-86 data reported in Tables 1 and 2. Significant increases in usage were observed for all techniques except the naive average accounting rate of return method. A significant uptake in all post-decision controls and six out of eight pre-decision controls was also found. The null hypothesis is rejected ($\alpha = 0.01$).

This finding is reinforced by the results in Table 5 showing that 60 percent of respondents believed that their capital budgeting system had become more sophisticated between 1981 and 1986, a slightly higher percentage arising for the 1975-1980 period. The strong increase in the adop-

Table 5
Capital Budgeting Sophistication and Effectiveness by Size
 (Response: 100 firms)

	<i>Total</i>	<i>Size of Capital Budget Millions of Pounds</i>			
		<i>5</i>	<i>5-25</i>	<i>25-50</i>	<i>50+</i>
Number of firms	100	24	23	21	32
Participants who believe that over the past five years their firm's capital budgeting system has become:	%	%	%	%	%
More sophisticated 1981-86	60	54	61	62	63
1975-80	64	58	57	86	59
More effective in evaluating and controlling projects					
1981-86	56	50	55	73	50
1975-80	69	65	59	79	72

tion of more sophisticated techniques contrasts with most earlier studies which seek to explain their slow rate of adoption (for example, Istvan, 1961; Churchman, 1964; Klammer, 1972; Sundem, 1974). It was earlier suggested that the narrowing gap between capital investment theory and practice may be explained, in part, by the widespread availability of computer software in the area and the rapid advances in end-user computing. This is borne out by the survey finding that 59 percent of firms surveyed apply computer-based financial software to capital budgeting. Tests of association between frequencies of use of such software and sophisticated techniques (Table 2) reveal that almost all techniques deemed sophisticated were significantly and positively associated with the frequency (five-point scale) of employing computer analysis. Only the naive average accounting rate of return was found to be negatively associated ($p < 0.05$) with the use of computing.

Sophistication and effectiveness

The benefits of installing computer-based investment systems are noted by many authors (for example, Keen, 1981; Gordon and Pinches, 1984). Such benefits as greater analysis of alternatives and critical assumptions, and more rapid response to unanticipated changes lead one to suggest that employment of more sophisticated methods gives rise to increased effectiveness in evaluating and controlling capital projects. Companies taking up sophisticated capital budgeting techniques and controls (such as net present value, probability analysis and post-completion audits) should, potentially, be more effective in evaluating and controlling capital projects than firms remaining with naive methods with little in the way of control mechanisms.

This gives rise to the null hypothesis:

Hypothesis 2: Adoption of sophisticated capital budgeting techniques and procedures has no

significant impact on capital budgeting effectiveness.

This hypothesis is tested in two very different ways. The first, more subjective, approach analyses the response to the survey question 'has your firm's capital budgeting system become more effective in evaluating and controlling projects over the past five years?'. Effectiveness was measured on a five-point scale. Extensive piloting of this question indicated that managers understood the question as the extent to which they were currently meeting capital investment plans (e.g. achieving the required return) compared with the situation five years ago.³ Table 5 reports that increased investment effectiveness was claimed by 69 percent of survey respondents for 1975-1980 and 56 percent for 1981-1986. Tests of association between perceived levels of changes in both sophistication and effectiveness (five-point scales) for the 1981-1986 period reveal a highly significant correlation coefficient of 0.71.

Managerial perceptions of change may give rise to self-serving bias, the natural direction being towards greater sophistication and effectiveness. This may be partially compensated for by testing for association between perceived changes in capital budgeting effectiveness and the computed actual changes in use of techniques 1981-1986. Rank correlations revealed significant positive associations ($p < 0.05$) for changes in six variables (IRR, probability analysis, financial evaluation, investment manual, performance monitoring, and post-completion audits).

The second test of Hypothesis 2 employs multiple regression analysis. Changes in each of the investment methods between 1981 and 1986, presented in Table 2, were computed as independent variables, together with the company size

³In some cases this question was not completed because the respondent had not been with the firm over the whole review period.

Table 6
Regression Equation: Dependent Variable is Change in Perceived Effectiveness 1981-86

<i>Explanatory Variable</i>	<i>Predicted Sign</i>	<i>Coefficient</i>	<i>Standard Error</i>	<i>T-significance</i>
Intercept		2.789	0.274	0.000
Coefficients of independent variables (changes 1981-86)				
Investment specialist		-0.787	0.287	0.009
Internal rate of return	+	0.753	0.292	0.014
Formal financial analysis	+	1.328	0.595	0.031
Monitor cost overruns	+	0.617	0.229	0.010
Post-completion audits	+	0.416	0.177	0.024
Inflation considered through sensitivity analysis		-0.587	0.240	0.019
Net present value	+	0.625	0.227	0.009
Shorten payback for risk	-	-0.573	0.212	0.010
Size	+	0.271	0.088	0.004
Adjusted R ²		0.483		
Overall F-test significance		0.001		

variable which has been shown to be an important factor in capital investment studies. These variables were incorporated into a regression model to estimate the change in investment effectiveness.⁴ If sophisticated methods, such as DCF and management science techniques, give rise to greater effectiveness they should yield positive associations with effectiveness, while naive methods should yield negative signs.

Table 6 summarises the step-wise linear multiple regression output giving significant variables at the 5% level. The equation explains 48.3 percent of the variation in the dependent variable. All regression coefficients have signs consistent with *a priori* predictions. Five sophisticated methods (including net present value and internal rate of return) are positively associated with effectiveness. The naive risk analysis technique of reducing payback period has, as predicted, a negative sign, although the payback method itself is not significant (possibly because it is used by virtually all firms). The negative sign for capital investment specialist explains why (as discussed earlier) this variable is the only one to have actually fallen over the past five years. It is also interesting to note that, while all management science techniques surveyed have increased considerably in uptake, none enters the regression equation, suggesting that respondents are not yet convinced of their decision-making utility.

⁴Strictly, the classical assumptions of regression analysis are violated by using a discrete dependent variable. However, it is accepted practice to treat ordinal measurements as internal measurements and to proceed with due caution. It is not feasible to specify an all logarithm model as the dependent variable has negative values in some cases. A partial log form, in which log size was taken rather than size itself, was considered but, because it is difficult to give a theoretical justification for transforming only one variable, an all linear model was preferred.

Some intercorrelation exists between certain explanatory variables which may influence results. To overcome this problem and to uncover underlying patterns, a factor analysis was conducted on the change in investment methods between 1980 and 1986 under the headings of naive methods, sophisticated techniques, pre-decision controls and post-decision controls. Naive methods included payback, accounting rate of return and shortening payback period for more risky projects. Sophisticated techniques are the remaining techniques listed in Table 2, while pre- and post-decision controls are listed in Table 1. Regression results (not reproduced here) strongly support the findings in Table 6. Analysis of residuals for the sample indicated no violation of regression assumptions.

The two tests adopted reach the same conclusion: Hypothesis 2 is rejected ($\alpha = 0.001$). Adoption of selected sophisticated investment methods is positively associated with capital budgeting effectiveness. Finance directors and controllers responding to the study are very clear in their own minds that the trend towards greater sophistication, at least in certain areas, improves investment decision-making. It is not possible from this study to test the validity of this belief. Certainly the empirical evidence to date (for example, Haka, 1985; Klammer, 1973) has not been able to demonstrate that increased capital budgeting effectiveness from using such techniques produces superior returns at the level of the firm.

Summary and conclusion

This paper has examined the trend towards greater sophistication in investment selection techniques and control processes between 1975 and 1986, and their resulting impact on the effectiveness in evaluating and controlling capital projects. Unlike most earlier studies, very significant increases in capital budgeting sophistication were noted, the primary

explanation offered being the rapid development in end-user computing and application of the computer-based financial packages to investment analysis and control.

Significant positive associations were obtained between the change in use of investment methods (actual and perceived) and perceived change in the effectiveness of project evaluation and control. The regression analysis found that more sophisticated techniques such as DCF methods and post-completion audits were significantly associated with higher levels of capital investment effectiveness while less sophisticated techniques were negatively associated. This finding offers a modest step in the right direction. Whilst most previous studies have been unable to detect a significant positive association between capital budgeting sophistication and firm performance, this study found that adoption of such methods is associated with greater perceived effectiveness in selecting and controlling capital projects. Senior finance executives, dealing with investment decisions on a regular basis, believe that it pays to employ discounted cash flow selection techniques, post-completion audit reviews and other control mechanisms.

The analysis of cross-sectional data using observations at regular time intervals, as reported in this study, is seen as a valuable approach to addressing other research areas in accounting and finance.

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Corporate Financial Reporting in Nigeria*

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Abstract—This paper reports on the extent of financial reporting by a sample of publicly quoted companies in Nigeria. Rather than examine the disclosure of specific items of information, the paper deals with the entire contents of the corporate annual report and highlights its different parts. The index of disclosure methodology is used to describe the trend of reporting practices between 1982 and 1986.

Introduction

The purpose of this paper is fourfold: to provide a brief discussion of the development of major accounting and corporate reporting institutions in a developing country—Nigeria; to examine some key factors at work in Nigeria; to consider Nigerian corporate financial reporting in the light of user needs and the regulatory framework; and to raise some suggestions for further analysis.

The literature on accounting in developing countries is so general that it is always difficult to discern the level of corporate financial reporting in these countries. Apart from studies on accounting systems in India (Singhvi, 1968; Jaggi, 1975; and Marston, 1986), in Nigeria (Jagetia and Nwadike, 1983) and in Mexico (Chow and Wong-Boren, 1987) there is neither a study on the perceptions of users of accounting information or the level of accounting information in any developing country, nor one which compares these issues (perceptions and disclosure indexes) between developing countries.

Whereas it has been suggested in the literature that accounting practitioners in these countries should be wary of assuming that the institutions of developed countries can be transplanted to their countries (Briston, 1978), this is not to say that one country cannot learn from another. A study of the experience of one developing country may help clarify the nature of corporate financial reporting problems for other developing countries. The study, therefore, intends to add to our understanding of accounting and reporting practices in developing countries and so provide additional material to enhance comparative analysis of accounting and reporting practices in developed and developing countries.

The environment of corporate reporting in Nigeria¹

Nigeria, a country with a population of approximately 100 million, was an under-developed country at independence (1 October, 1960) when it proposed an estimated overall five-year capital development expenditure budget of N2.2 billion² in the 1960–65 national plan. In contrast, the 1980–85 national budget proposed a five-year capital development expenditure of N80 billion. This phenomenal growth in the country's development programme is the product of the gains from crude-oil export earnings. The affluence arising from petroleum exports propelled unstructured growth in various sectors of the economy to the neglect of control mechanisms such as accounting information. By the end of 1987, Nigeria had become a net debtor country. Like many other developing countries, Nigeria is burdened by external debt (about US \$26 billion) to the developed countries.

Nigeria's history, since independence, has been marked by disjunctive breaks in democratic system of government brought about by military coups (seven between 1966 and 1985). The country has tried two known democratic systems of government: the British parliamentary system and the American presidential system. The military governments have ranged from absolute dictatorship to benevolent despotism. These changing fortunes and political/military systems of government provide a rich kaleidoscope for the study of environmental influences on the accounting profession and practice in the country.

¹A more detailed discussion of the Nigerian accounting environment is provided in Wallace (1987). Other information on accounting systems in Nigeria can be found in Jagetia and Nwadike (1983) and Price Waterhouse (1982). The literature on accounting in Nigeria includes the evolution of its accounting (Briston, 1978), the beginnings of its accounting profession (Ogundele, 1969), the challenge to its accounting profession (Gbededio, 1977).

²At that time the Nigerian currency (N £) was backed by the British £ Sterling and had the same value. When the currency was changed in 1972 to Naira (N) it retained linkage with the £ sterling and converted at N2 to the £. The Naira now (March 1988) converts at N7.15 to the £.

*This paper draws on part of a doctoral thesis submitted to the University of Exeter. I am indebted to my supervisor, Professor R. H. Parker, for his continual support and helpful comments. I appreciate the additional comments on earlier drafts by Mr. T. E. Cooke and two anonymous reviewers. The financial support of the Institutes of Chartered Accountants in England and Wales and of Nigeria is gratefully acknowledged.

Before 1979, the Nigerian accounting environment mirrored that of the pre-1967 UK.³ In 1979, Nigeria adopted the US presidential democratic system and began to create many of the institutions and regulatory frameworks which were presumed to differentiate the US from the UK. One such institution created in 1979 was the Nigerian Securities and Exchange Commission (NSEC). This body was charged with the surveillance and development of the overall securities market, the mobilisation and formation of capital and the protection of investors. Also included in its mandate is the power to regulate corporate disclosure by enterprises seeking quotations for their securities. However, the NSEC has chosen not to exercise this right, and has surrendered it (by inaction) to the Nigerian Accounting Standards Board (NASB) founded in September 1982. In 1979, the Nigerian Stock Exchange (NSE) began to demand that draft annual reports be sent to it for approval before they are printed and circulated by reporting enterprises to their members for approval at the Annual General Meeting.

The primary source of (mandatory) corporate disclosure rules in Nigeria is therefore the Companies Act 1968. The secondary (obligatory or voluntary) sources of corporate disclosure rules (including accounting standards) are the NSE and the NASB. International Accounting Standards (IASs) and the accounting standards of some developed nations (particularly the UK—SSAPs) have tremendous influence on accounting practices and standard-setting in the country. On the impact

of IASs, the Institute of Chartered Accountants of Nigeria (ICAN) requires its members to ensure that the accounts of their clients (reporting enterprises) comply with the extant IASs not superseded by local standards issued by the Nigerian Accounting Standards Board (NASB). This Board has issued six accounting standards since 1984 when it began to do so:

	Effective date
SAS 1 Disclosure of Accounting Policies	1 Jan. 1985
SAS 2 Information to be Disclosed in Financial Statements	1 Jan. 1985
SAS 3 Accounting for Property, Plant and Equipment	1 Jan. 1985
SAS 4 Accounting for Stocks and Spare Parts	1 Jan. 1987
SAS 5 Accounting for Construction Contracts	1 Jan. 1988
SAS 6 Extraordinary Items and Prior Year Adjustments	1 Jan. 1988

In the development of these standards, the NASB has made it a practice to consult similar standards developed in the USA, the UK, Canada, Australia, India and New Zealand and by IASC, in order to identify and list all possibilities by which one could regulate events and transactions relating to the topic. The aim is to develop a standard which can assist all those who need to use it. The NASB has the backing of the NSE and NSEC and relies on them to use their good offices to ensure compliance with its standards by enterprises supervised by them. The NSE has recently requested all its listed companies to comply with NASB standards.

Research data and methodology

The approach to the study of national disclosure practices has been to investigate the extent to which specific non-mandatory items of information are reported (or volunteered) in corporate annual reports (CARs) (Buzby, 1974; Barrett, 1977; Firth, 1979; McNally *et al.*, 1982; Firer and Meth, 1986; and Chow and Wong-Boren, 1987). The choice of the items to be investigated is informed by their perceived relevance to the relevant user-group. An analysis of a sub-set of information items which a financial report carries not only ignores the multicollinearity effects of the items in the sub-set with the excluded items but also conveys a partial, and probably misleading, picture of financial reports.

The information which a user expects from a CAR may agree or disagree with that which a reporting enterprise wishes to convey; this is because the financial report is not meant to convey a single 'theological' meaning—it is a multi-

³The current Nigerian Companies Act (1968) is a replica of the UK Companies Act of 1948 with few exceptions. One is the applicability of the corporate reporting rules in the Act to all companies; there is no exempt private company. The other is the introduction of a special chapter which requires all foreign companies operating in Nigeria to register as Nigerian companies; in short, no foreign company can open up a branch office in Nigeria unless it is undertaking a special government contract. The Act specifies the minimum level of information which annual reports must contain. Professional practice in the country was also based on what prevailed in the UK. This is principally because of the membership structure of the accounting profession in the country. An organised accountancy profession started in Nigeria in 1960 with the formation of The Association of Nigerian Accountants. Members were resident Nigerian and non-Nigerian members of recognised overseas accountancy bodies. In 1965, the association was recognised by the Nigerian government and was absorbed by The Institute of Chartered Accountants of Nigeria (ICAN), established by an Act of Parliament in September, 1965. ICAN is the largest accountancy body in Africa. Its membership (excluding non-Nigerians) at 31 December 1987 is 4,200. About 40 per cent of its membership were previously admitted by one of the UK CCAB bodies and 20 others are American CPAs. The rest qualified locally through the Institute's examinations which started in 1968. These examinations were supervised and moderated from 1968 to 1973 by the then Overseas Accountancy Examinations Advisory Board in the UK. This Board was a sub-committee of the Joint Standing Committee of the three Institutes of Chartered Accountants (Ireland, England and Wales and Scotland). The Nigerian Institute took over the full conduct of its own examinations in 1974.

dimensional space in which a variety of information items blend (or clash?).

A study of the various parts (or financial statements) may provide more meaningful information about the quality of financial reporting in a country than the study of selected items of information. This overall study of the CAR and its constituent parts is described in this paper as a 'spatial analysis'.

The measurement of the extent and scope of reporting was based on a scoring sheet⁴ which was used in grading the different parts of each reporting company's annual report in each of the survey years (1982–1986). In order to measure the level of disclosure in CARs, an index was developed from the scores awarded to each item disclosed. Each company was evaluated on the basis of the relationship between what it disclosed and what it was expected to disclose. If the disclosure of an item depends on the occurrence of a preceding event and a reporting company has not experienced such an event, such an item was not included in the evaluation of the company's index. For example, a company that has no subsidiary or associated company would not be expected to publish group or consolidated accounts; so all the items of information relating to consolidated accounts (minority interests, goodwill arising from consolidation) will be excluded from the items by which such a company was evaluated. In order to determine if an item not found in the corporate reports of any one company was to be excluded because a preceding event had not occurred, it was necessary to go beyond the annual reports of such an enterprise. In addition to an interview with the head of accounts of the reporting company, such other corporate documents as prospectuses issued by all sampled companies, statements of management at annual general meetings, press releases, and reports filed with regulatory authorities between 1978 and 1986 were examined. There are two features underlying the scores earned by each company: the list of information items and the method of grading the disclosure or non-disclosure in a CAR.

⁴A copy of this annual report scoring sheet is available on request from the author. The scoring sheet was divided into two parts. Part I was used to extract certain information about the attributes of a sampled company and Part II to rate its actual disclosure. The belief is that both parts of the scoring sheets can be successfully completed by examining the annual reports of the sampled companies and other available records on these companies in Nigeria. To reduce this author's subjectivity in interpreting the annual reports of the sampled companies a second rating of the annual accounts was undertaken independently by a Nigerian chartered accountant. Both ratings were in substantial agreement; the Pearson correlation coefficient between the two ratings was 0.9845 ($p < 0.0001$). In the few cases where there were disagreements our scores were reconciled so that an agreed score on each company finally emerged. The results reported here are based on these agreed scores.

Development of the List of Information Items

A list of information items that are and could be disclosed in the annual report of profit seeking enterprises was developed. Bias can arise if the selected list of items is not sufficiently comprehensive. The scope of the selection would usually be determined by the focus of the research. To the extent that research foci vary amongst researchers, there is no general theory on item selection. In this study, an item was included in the list of 185 items if it met one or more of the following criteria:

1. it is covered in previous research studies;
2. there is a legal obligation to disclose it;
3. it is a desirable disclosure in terms of Statements of Accounting Standards issued by NASB or IASC as long as it is applicable to the country, the rules of the NSE, or any other rules applicable in the country during the period 1980–1984;
4. it is not previously investigated but recommended in the international accounting literature as relevant and significant to the average user of annual report in a developing country; and
5. it relates to a controversial issue in the country such as the desire of government to conserve foreign exchange reserves or to control the importation by enterprises of raw materials into the country.

The idea was to develop a wide-ranging list which is not specifically directed at a particular group of users as previous studies seem to have been. The selection was, therefore, not constrained by criteria which previous researchers have used to limit choice—such as exclusion of statutorily required items (Firth, 1979, p. 130; Firer and Meth, 1986, p. 374) or of items likely to be irrelevant to investors (Barrett, 1977, p. 5). This is because the subject of this research is 'general purpose' financial reports that should serve the needs of all users.

In order to determine the relevance of disclosure in CARs a perception survey of six user-groups in Nigeria was conducted. Figure 1 shows the respondents to a questionnaire⁵ which pooled opin-

⁵A copy of this questionnaire can be obtained, on request, from this author. Each respondent was requested to provide answers to the two parts: Part 1 requested information about demography—age, marital status, occupation, level of training in accountancy, etc. Part 2 elicited the opinions of the respondent on the different types (or sections) of the CAR as well as opinions on the level of importance of 102 items of information. Some of these items were later disaggregated for the purpose of analysing the contents of CAR of sampled companies. This disaggregation increased the items investigated to 185. In another paper (*British Accounting Review*, Vol. 20, No. 3, December 1988), this author reports that there is a lack of consensus, in Nigeria, between accountants as a user-group and all other user-groups (investors, financial analysts, government officials, managers, and other professionals).

Figure 1
Structure of data on perceptions of Nigerian users

User Group A =	148 out of 300 Accountants sampled = 49.3% response rate. The 148 includes 8 non-Nigerian Accountants resident in the country.
User Group B =	58 out of 200 Financial Analysts Sampled = 29% response rate.
User Group C =	49 out of 100 Top Civil Servants sampled = 49% response rate.
User Group D =	45 out of 200 other professionals sampled = 22.5% response rate.
User Group E =	82 out of 200 Managers sampled = 41% response rate.
User Group F =	88 out of 200 Investors sampled = 44% response rate.
Total = <u>470</u> Nigerian Respondents	

ions on the level of importance of each disclosure item in the list, other sources of information apart from the CAR (e.g., advice of analysts, newspapers etc.) and differing preferences for the different parts of the annual report.

Scoring the Disclosure Items

The trait of interest is the level and extent of disclosure. This disclosure was treated as a dichotomous variable—whether an item is disclosed or not disclosed. In this context, the disclosure score for a company is additive:

$$D = \sum_{i=1}^{185} a_i$$

where

$$a_i = \begin{cases} 1 & \text{if the item (i) is disclosed} \\ 0 & \text{if the item (i) is not disclosed} \end{cases}$$

The scoring system was, however, informed by the way an item of information is presented. In this context, disclosure was categorised on the basis of its 'intensity'. Intensity is not complexity. For example, a one-line item of information may be assumed to be less detailed (and so less intense) than disaggregated information on the same item only if the disaggregated item is not made too complex for the reader. If an item of information is considered better communicated by producing sub-elements, the different sub-elements are also scored, so that the relative density of the information provided can be recognised. For example, when ten or more years' financial history is provided the score is say 4 marks, when the financial history provided is for 5 to 9 years the score is 3 marks and when 2 to 4 years' history is provided the score is 2 marks.

Disclosure Indexes

The index of disclosure is the measure by which the level of financial reporting of one company was compared with another. It refers to the relative

level of disclosure by a company and is the ratio of actual scores awarded to a company for the contents of its CAR and the scores which that company is expected to earn. Two types of disclosure indexes were constructed.

The first was an unweighted index which is the ratio of the number of items a company disclosed divided by the total that it could have disclosed. The unweighted index permits an analysis independent of the perceptions of a particular user group (Chow and Wong-Boren, 1987, p. 536) and allows the evaluation of the CAR in a 'general purpose' context because all disclosure items are treated as equally important to the *average* user. Additionally, the items of information processed were so many [185] that they would even out the differing preferences of the different user groups. But it could be argued that adding scores across all possible kinds of disclosure items may obscure different degrees of importance. The fact that different user groups value each item differently may also neutralise the relative importance of each disclosure item to all user groups. Six weighted disclosure indexes reflecting the preferences of the different user groups were constructed. Each of these indexes is the sum of all items a company disclosed weighted by the mean importance rating of a particular user group divided by the total of the weighted score for all the items the company could have disclosed.⁶

Sample of Companies

The equities of 94 companies are traded on the floor of the NSE. The companies are classified into four categories: Banking and Finance, Manufacturing, Commercial and Service by the

⁶It is not the intention to rectify these weights. But it is believed that by constructing indexes based on different user groups' preferences, it would be possible to determine whether some groups are better served than others. The suggestion of an anonymous reviewer that this line of enquiry be pursued is gratefully acknowledged.

NSE. There are seven companies classified under Banking and Insurance which are not within the scope of this research and are therefore excluded. This leaves 87 companies from which 47 were selected on the basis of (i) availability of their CARs in the Library of the NSE where they are stacked once they have been received at the Exchange, (ii) access to other documents which would enable the determination of preceding events, and (iii) permission to interview the head of accounts of a company.⁷ The comparative distributions of the companies in the population and the sample are given in Table 1 below:

Table 1 Relationship between sampled companies and population					
	<i>Population</i>		<i>Sample</i>		<i>Sample/Population</i>
	No.	%	No.	%	%
Manufacturing	49	56.3	24	51.1	49.0
Commercial	28	32.2	18	38.3	64.3
Service	10	11.5	5	10.6	50.0
	<u>87</u>	<u>100.0</u>	<u>47</u>	<u>100.0</u>	<u>54.0</u>

Extent of disclosure

Popular and Rare Items of Disclosure

Some items of information were disclosed (popular) in all sampled Nigerian CARs; other items are absent (rare) in all the CARs of sampled companies (Table 2). Part A of Table 2 is a list of information items disclosed by all sampled companies.

This list of 38 items includes both statutorily required and voluntary disclosure. The remaining 147 items of information studied revealed varying levels of disclosure. 112 of these items are statutorily required and the remaining 35 can be described as voluntary disclosure items. The 120 statutorily required and the 65 voluntary items of information are respectively spread among the different parts of the CAR as follows: balance sheet [48, 10], income statement [30, 10], other financial statements (e.g., value added statement, fund flow statement) [15, 10], statistical data [5, 15], valuation methods [20, 5], social data (e.g., employee report, transfer of technology) [0, 10] and historical data [2, 5].

⁷However, this selection process does not harbour any potential self-selection bias, because the sample covers all the different industrial groupings and size ranges. The CAR of the other enterprises not selected were also scored and compared with those of the sampled companies in respect of some mandatory items which do not require the occurrence of a preceding event and no significant differences were noticed.

Quality of Different Types of Disclosure

The average level of overall disclosure in the Nigerian CAR and its different parts for the sample between 1982 and 1986 are given in Table 3 below.

Between 1982 and 1986, corporate financial reporting seems to have responded to several environmental factors. A relatively superior level of disclosure was discernible during the brief period of political activity (1979–1983). This noticeable positive development seems to have embarked on a downward slope from 1985.

Surprisingly, however, the return to military rule early in 1984 was followed by an aggressive demand by the government for accountability from all sectors of the economy. This might explain the better financial reporting in that year.⁸ In the following year, a new military administration took over. This government was probably more concerned with implementing the programme of structural adjustment recommended by the World Bank as a pre-condition for helping the country out of its financial problems, than with accountability and corporate reporting issues. During this period, the country experienced a higher level of economic recession which resulted in the promotion of austere government policies and led to

⁸A dichotomised analysis of statutory and voluntary items between the two types of regimes (political and military) did not reveal a different tendency. This speculation about the extent to which corporate disclosure is determined by the form of government can only be tentative and partially correct. The succession of three different regime types—parliamentary government, military government and presidential government—coexisted with a principle of non-interference with the accounting profession. This researcher did not notice any discernible difference in technical skills, ethics and values prevalent in the accounting profession under three regime types. There is, however, a pervasive lack of appreciation of the role of accountants in society (Gbenedio, 1977, p. 5). The overall conclusion is that changes in regime type did not produce significant changes in corporate disclosure. The analysis, however, provides a line of research enquiry for many African countries locked in what Ghartey (1985) called 'the threshold of political instability'.

Table 2**PART A****Items disclosed by all sampled companies**

1. Gross, Net and Disaggregated Values of Fixed Assets
2. Gross and Disaggregated Value of Current Assets
3. Gross and Disaggregated Value of Current Liabilities
4. Number and Value of Equity Interests
5. Amount of Paid and/or Unpaid Equity Interests
6. Equity Interest owned by management
7. Funds Flow Statement showing Sources and Application; and Changes in Working Capital [*]
8. List of Directors [*]
9. List of Top Management [*]
10. Shares held by Directors
11. Future Economic Factors usually presented in comment form in the Chairman's Report [*]
12. Auditors' Report

PART B**Items not disclosed by any of the sampled companies**

- 1.* Unexpired Useful life of Fixed Assets
- 2.† Security Status of Debentures
- 3.* Ageing Schedule of Debtors
- 4.† Information on future dilution of Equity
- 5.* Details of Operational Expenses
- 6.‡ Advertising and Publicity Expenses
- 7.‡ Price Level Adjustment Information
- 8.‡ Revenue Recognition Method
- 9.* Segmental Disclosure on Sales/Income based on—Domestic/Export Market
Geography i.e. location within the country
- 10.* Projection of Sales and Outstanding Orders
- 11.‡ Dependence on Few Customers
- 12.* Planned Capital Expenditure
- 13.* Planned Advertisement and Promotion Expenditure
- 14.† Stock Options
- 15.* Cash Flow forecast for the next 2–5 years
- 16.* Industry Trends
- 17.* Labour Turnover
- 18.* Disclosure of Strike Settlements
- 19.* Effect of National Wage Settlements
- 20.* Index of Selling Prices
21. Information relating to Transactions with Government e.g. ‡Government as Customer/Supplier
*Money Exchanged with Government
*Foreign Currencies Bought/Sold
- 22.‡ Local Content of Raw Materials and Components bought
- 23.†‡ Details relating to Related-party Transactions
- 24.* Donations to Political Parties
- 25.* Information on Outstanding Tax Liabilities
- 26.* Declaration of Directors as to the Veracity of Financial Statements

Key: † = Required by NSE; ‡ = Required by NASB; * = Voluntary disclosure.

the adoption of cost reduction strategies by many companies and institutions. This desire for cost reduction and the need to reduce the likelihood of being caught by the government's increasing surveillance might have contributed to the declining level of corporate disclosure. A noticeable indication is the drop in the length of CARs by about 50% between 1984 and 1986. Many

companies have stopped giving copious notes to their published accounts and some have stopped publishing value added and funds flow statements.

On the average, 24 of the sample showed a marked decline in their level of disclosure over the five years, whereas ten revealed a gradual improvement. There is no consistent pattern of corporate behaviour in the changes observed.

Table 3
Spatial disclosure in annual reports 1982-1986

	1982	1983	1984	1985	1986
	%	%	%	%	%
<i>Overall</i>	39.75	38.23	43.11	40.64	37.55
Balance Sheet	60.43	61.76	65.21	64.37	62.01
Income Statement	34.51	35.21	27.48	27.32	27.11
Other Financial Statements	57.35	59.45	46.74	41.25	38.32
Forecasts	12.14	13.57	14.66	10.72	9.12
Statistical Data	33.35	30.94	27.26	24.91	22.16
Valuation Methods	58.72	52.36	47.43	45.75	44.43
Social Data	27.24	27.98	30.40	22.65	18.35
Historical Summary	67.25	69.45	77.13	77.72	78.52

The overall disclosure index in 1984, perceived as the best of the five years studied, revealed a weak level of disclosure with only four out of the 47 sampled enterprises scoring 50% or more (the highest being 52%). The lowest score was 35%. The accounts of 1984, used as the representational model, revealed the following disclosure indexes:⁹

<i>Overall Disclosure Index</i>	
%	<i>No. of Companies</i>
Greater than 50	4
Between 40 and 50	33
Between 30 and 40	10
	<u>47</u>

The overall disclosure index was disaggregated into various indexes (Table 4) reflecting different types of disclosure: Balance Sheet, Income Statement, Other Financial Statements such as Funds Flow and Value Added, Projections, Statistical Data, Notes to Accounts including valuation and measurement methods and accounting policies, Social Information and Historical Surveys.

The conclusions which can be drawn from above Tables 3 and 4 are that:

- (1) there is a high level of disclosure of balance sheet and historical survey items and probably valuation methods,
- (2) there is an apparent weakness in respect of disclosures relating to projections, statistical data, social reporting, and income statement items, and

⁹An earlier study of the company characteristics likely to influence corporate disclosure in Nigeria, by this author, found that the extent of compliance with statutorily required disclosure items increased with the extent of participation of transnational corporations in the equity of the reporting company. Assets size provided a weak explanation of the variation noticed in the voluntary disclosure index. Liquidity, profitability, sales, number of shareholders, foreign country in which a parent company is located and type of business did not yield any significant effects on reporting enterprises' increased or decreased disclosure.

- (3) the growing interest in the publication of funds flow statements and value added statements noticed up to 1984, declined in 1985 and 1986.

The high level of disclosure in the balance sheet and in historical surveys arises from two facts:

- (i) a greater proportion of the information required by the 8th Schedule of the Nigerian Companies Act to be published in annual financial statements of enterprises relates to balance sheet and notes;
- (ii) the demand for historical survey data on some items of the balance sheet, income statement and other significant data by the Nigerian Stock Exchange.

Similarly, the paucity of information on the income statement, projections, social reporting and statistical data is brought about by the fact that there is:

- (a) little or no legal requirement to disclose more information relating to these categories;
- (b) a lack of demand for such information by the NSE;
- (c) the probable fear by reporting enterprises that such disclosures may bring about more negative than positive reactions from many quarters. Such reactions include those from competitors, trade unions, and government; and
- (d) a seeming lack of interest in the audit of such information by Nigerian auditors, invariably because of technical difficulty and fear of potential litigation, to attest to the validity of many such numbers.

Disclosure Indexes and Compliance

An item by item comparison was made between the contents of annual reports and the contents required by law. Law, here, means the relevant

Table 4**Distribution of disclosure indexes**

<i>Indexes</i>	<i>Balance Sheet</i>	<i>Income Statement</i>	<i>Other Financial</i>	<i>Projections</i>	<i>Statistical Data</i>	<i>Valuation Methods</i>	<i>Social Data</i>	<i>Historical Summaries</i>
100%	—	—	—	—	—	—	—	5
70%–80%	15	—	—	—	—	—	—	41
> = 60% but < 70%	20	—	4	—	—	3	—	—
> = 50% but < 60%	10	1	20	—	—	11	—	1
> = 40% but < 50%	2	4	2	—	—	29	—	—
> = 30% but < 40%	—	9	21	4	11	4	34	—
> = 20% but < 30%	—	25	—	10	35	—	13	—
> = 10% but < 20%	—	8	—	12	1	—	—	—
< 10%	—	—	—	21	—	—	—	—
	<u>47</u>	<u>47</u>	<u>47</u>	<u>47</u>	<u>47</u>	<u>47</u>	<u>47</u>	<u>47</u>
Judgment ¹⁰ on the level of disclosure in Nigerian CARs	High	Low	Average	Low	Low	Average to High	Average	High

sections of the Companies Act, and the requirements of the NSE because all companies in the sample are NSE listed. The aim is to discover if there is a significant difference between the items disclosed in CARs and those regulatory disclosure minima in Nigeria. The classification consisted of determining whether or not a company's CAR contained (i) more, (ii) the same amount, or (iii) less of the details relating to statutorily required items which the company was expected to disclose. The aggregated result of such an analysis is given in Table 5. This provides sufficient evidence that many enterprises publish CARs that do not adequately comply with the disclosure regime. The

information revealed by Table 5 suggests that whatever mechanisms are used by NSE for monitoring compliance of its listed companies with disclosure regulations in Nigeria seem inadequate.

At present, accounting practice in Nigeria takes place in an atmosphere of freedom. The reporting enterprise and the individual auditor are autonomous actors who greatly affect the quality of disclosure and the level of compliance with disclosure regulations, so that current attempts to standardise measurement and valuation rules would depend on voluntary compliance by reporting enterprises and their auditors. The ultimate fate of accounting practices should not depend largely upon the mutual consent of auditors and their clients because these two groups are less likely to be interested in promoting disclosure for the benefit of society in preference to the primary pursuit of their profits. It probably needs to depend more on the positive interaction of the roles of NASB, NSE, NSEC and the accounting profession.

¹⁰Because of the newness of this procedure, one cannot tell whether a particular percentage is 'poor', 'above average', etc., since there is no comparable data from any country. Such statements on the extent of disclosure in CARs are judgmental and guided by this general principle: index above 50% is considered good, between 30 and 50% is average and less than 30% is poor.

Table 5**Compliance with accounting regulatory minima**

Number of companies disclosing items which, compared with the law, are

	<i>More than Adequate</i>	<i>Adequate</i>	<i>Less than Adequate</i>	
<i>Items in:</i>				<i>Total</i>
Balance Sheet	7	24	16	47
Income Statement	5	20	22	47
Notes to Accounts	8	18	21	47
Directors Report	6	17	24	47

Table 6

Perceived level of importance of different sections of the CAR (mean scores)

	<i>Chartered Accountants</i>	<i>Financial Analysts</i>	<i>Civil Servants</i>	<i>Other Professionals</i>	<i>Managers</i>	<i>Investors</i>	<i>Overall</i>
Balance Sheet	4.462 [1]	4.490 [1]	4.227 [5]	3.950 [3]	3.947 [3]	4.081 [1]	4.210 [1]**
Income Statement	4.394 [2]	4.120 [2]	4.364 [2]	4.103 [2]	4.039 [1]	3.756 [4]	4.123 [2]**
Other Financial Statements	4.115 [4]	4.102 [3]	4.516 [1]	3.425 [9]	3.777 [5]	3.593 [7]	3.695 [4]**
Measurement Methods	3.951 [5]	3.696 [6]	3.349 [9]	3.600 [8]	3.929 [4]	3.793 [3]	3.777 [5]*
Statistical Data	3.505 [7]	3.674 [7]	4.000 [7]	3.925 [4]	3.622 [7]	3.779 [5]	3.705 [6]*
Projections	3.548 [6]	3.620 [8]	4.350 [3]	3.821 [5]	3.627 [6]	4.122 [6]	4.025 [7]**
Social Data	2.336 [9]	3.740 [5]	4.238 [4]	3.775 [6]	3.587 [8]	2.721 [9]	3.661 [8]*
Historical Summaries	2.818 [8]	3.125 [9]	4.167 [6]	3.694 [7]	3.405 [9]	3.720 [8]	3.705 [9]**
Audit Report	4.327 [3]	3.980 [4]	4.112 [7]	4.195 [1]	4.013 [2]	3.965 [2]	4.112 [3]*

*Significant at level of 0.05; **Significant at levels of 0.05 and 0.01. [] = Rankings

Level of Corporate Disclosure and Expectations of Users

Table 6 provides a summary of the perceived importance of the different sections of the CAR to the six different user-groups.

Like the results reported by Chang, Most and Brain (CMB) (1983), for the US, UK and New Zealand, the ranking of the different sections of the CAR showed a remarkable consistency for all user-groups in respect of the traditional financial statements—balance sheet, income statement and measurement methods (statement of accounting policies and other notes to the accounts). Contrary to CMB's findings, the audit report seems to be rated most highly by all user-groups, probably revealing a high level of respect for the professional competence of Nigerian auditors or the presence of a high level of ignorance among 'non-accountant' users about the role of the auditors vis-à-vis accounting numbers. Civil Servants seemed rather different from the other user-groups in their importance ratings of some of the other parts of the CAR. They rated projections, social data, historical summary and other financial statements more highly than any other group, in line with the wishes expressed in Briston (1984).

McNally *et al* (1982, p. 15) suggested a procedure for comparing the popularity of an item of information among the annual reports issued by sampled companies with the perceived needs of users for such an item. As this study is concerned more with groups of items than with individual items, this procedure was adapted to serve the needs of evaluating the different blocks of information investigated. The individual company indexes were aggregated and divided by the number of companies in the sample to determine the mean index of disclosure for the country. The

mean indexes would enable an opinion to be formed on the degree of agreement between the sampled companies and the surveyed users. The procedure followed to derive the degree of agreement on disclosure type resulted in the production of Table 7 which summarises three different but related measures of corporate disclosure explained below:

1. The mean disclosure indexes derived for each block of information provide a basis for indicating the level of disclosure (Column 1) of all the sampled companies in an aggregated form for the relevant disclosure type.
2. Column 2 is the statistic which represents the perceptions of users in respect of the different sections of the annual report (Table 6) and denotes the level of importance which users attach to this section. The overall mean scores (Table 6) were divided by 5 to evolve the resulting statistics which are used to proxy the perceived level of importance for the different parts of the CAR.
3. Column 3 gives a measure of the gap between the measures in Columns 1 and 2.¹¹ If the overall expectation of the users agrees with the revealed preference of reporting enterprises, the degree of agreement (measured by finding the ratio between the level of disclosure and the level of importance) would be 100%. If this ratio exceeds 100%, as it did in

¹¹For the purpose of identifying which user group has been better served, six weighted disclosure indexes were constructed using mean scores of perception ratings of different user groups as weights for each item disclosed. The resulting mean indexes become the numerator of the statistic yielding the degrees of agreement with the expectations of the different user groups shown in the columns following column 3 in Table 7. The denominators for the statistics are constructed from Table 6.

Table 7

Agreement between actual disclosure and the perceptions of user groups

	Degree of Disclosure %	Importance to the Average User %	Overall Degree of Agreement %	Varying Degrees of Agreement					
				CA. %	FA. %	CS. %	OP. %	M. %	I. %
Balance Sheet	65.2	84.2	77.4	85.2	79.4	65.2	67.4	75.1	71.2
Income Statement	27.5	82.5	33.3	68.5	60.3	25.5	51.2	30.2	24.3
Other Financial Statements (e.g. Funds Statement)	46.7	73.9	63.2	75.2	71.3	47.3	55.6	48.7	47.4
Measurement Methods	47.4	75.6	62.7	81.2	62.5	46.3	57.8	61.8	54.4
Statistical Data	27.3	74.1	36.8	62.5	55.3	27.2	42.8	28.5	32.1
Projections	14.7	80.5	18.3	38.2	13.5	10.3	21.5	15.8	10.1
Social Reports	30.4	73.2	41.5	42.5	30.3	11.4	18.7	16.4	15.7
Historical Summary	77.1	74.1	104.2	125.4	101.5	72.5	82.1	71.8	67.7
Audit Report	100.0	82.2	121.7	115.5	120.6	116.8	121.5	108.5	118.3
Overall Index			47.4	51.3	48.2	28.2	42.1	31.4	29.3

the case of historical summary and the audit report, the presumption is that enterprises preferred the disclosure of items in this section more than the users preferred the items in the section. This is, perhaps, simplistic but that is the nature of statistics which aggregate items.

Information disclosed in CARs of the sampled companies does not seem to be in line with the perceived needs of important user-groups. On the basis of the degrees of agreement, chartered accountants seem better served than other user groups in Nigeria. The weights developed from their mean perception scores produced the highest overall and sectoral indexes for corporate reporting in Nigeria. Civil servants and investors are the least well served in the country. This disagreement is more pronounced in respect of voluntary disclosure items pertaining to projections, income statements, statistical data, and social reporting. This finding is similar to that reported on New Zealand where the level of voluntary corporate disclosure (in 1979) was found to be lower than the external users considered desirable (McNally *et al*, 1982).¹² All the eight items not disclosed by any company in the McNally *et al* study are included list of 26 items (Table 2) not disclosed by any company in this study.

¹²McNally *et al*'s study of corporate disclosure of voluntary items in 1979 by 105 manufacturing companies in 'the small (a population of three million), developed but relatively young economy of New Zealand' cannot form the basis of a valid comparison. The selection of the 105 companies was biased in favour of those 'believed by the authors to observe high standards of financial reporting' (p. 12); this was not the case in the Nigerian study. The New Zealand economy is developed whilst the Nigerian economy is developing. There is also the most fundamental issue of whether the concepts employed in this study are truly equivalent to those in the New Zealand study. How can one be sure that the phenomena studied in the different contexts are the same?

The reasons for the disparity between actual disclosure and what external users considered desirable may include the fear that information provided may be put to uses probably detrimental to the reporting firm, the cost of providing the information, ignorance of the importance attached to the various sections of CARs by users or an indifference to the needs of users.

This apparent divergence between actual disclosure and desired disclosure may be the outcome of a reluctance to disclose data which companies consider sensitive including profit forecasts, rate of return, customer dependence. Alternatively, it may reflect a lag between the rapidly changing needs of users for data and the slower evolution of company disclosure practices (McNally *et al*, 1982, p. 16).

Conclusions

The objectives of this study were to report on the extent of financial disclosure by profit-seeking publicly quoted companies in Nigeria and to compare the level of actual disclosure with accounting and financial disclosure requirements and the pooled views of various users of CARs in the country. A spatial investigatory methodology was developed which uses disclosure indexes. This methodology enables the revelation of the overall picture of corporate reporting practice in the country. Its newness prevented comparison with the results of previous studies which sought to give partial pictures of the practices prevailing elsewhere.¹³

¹³Even if this were possible, only one study of the level of disclosure in CARs of a developing country (Mexico) (based on the disclosure index methodology) has been reported in the literature (Chow and Wong-Boren, 1987). The study captures only voluntary disclosure items and so its data are inadequate for comparative purposes. All other studies are on developed countries and it seems unreasonable to compare these data with such studies.

The results of the spatial analysis reveal a dualistic pattern in the sampled CARs: the more desired types of information are relatively abandoned and/or overshadowed by the types which are not so relevant to the needs of users but preferred by the accounting profession and the reporting entities. This dualism in the Nigerian CARs seems to indicate that the traditional statements and their formats (inherited from the colonial days) are probably seen as minimum information which every CAR must carry and which are not to be adapted to respond to the socioeconomic needs of the country. It also indicates that the modern statements which are capable of responding to the socio-economic conditions prevailing in the country are not so popular.

Other notable features of the Nigerian reporting practice were the poor compliance with the disclosure requirements, and the relatively low importance attached to the needs of the users. Although the results are derived from a sample of 47 profit-seeking NSE listed companies it is likely that the findings are applicable to all other NSE listed companies. These companies are among the more profitable and efficient ones and it could be argued that the companies whose shares are not traded on the floor of the NSE are less likely to supply the sort of information which the sampled companies seem unwilling to provide. Many of these unlisted companies do not file their accounts with the Registrar of Companies as required by the law and those that do, probably do not meet the minimum disclosure requirements. If NSE listed companies fail to comply with financial reporting requirements, it is more than likely that unlisted companies would disregard the rules. It seems obvious therefore that there are a number of areas where preparers and regulators can improve the quality of their disclosure in CARs.

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The Application of Management Accounting Techniques to Marketing

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Abstract—This paper examines the accounting techniques presently used to assist decision making and control within the marketing function of companies that operate in a highly competitive industry. The overall observation is that, while the use of these techniques is greater than in earlier studies conducted in less competitive industries, only a handful of management accounting techniques considered superior by the conventional wisdom have found their way into regular usage. No evidence was found to indicate that better performing firms employ these techniques on a more regular basis.

The gap between management accounting theory and practice has received increasing attention in the literature in recent years (for example, Kiani-Aslani, 1977; Imhoff, 1978; Coates *et al.*, 1983; Kaplan, 1984). Although there is some evidence that the gap is closing in some areas (Scapens, 1983) it is still appreciable in others, particularly in fundamental areas such as cost behaviour analysis (Coates *et al.*, 1983). The productive development of management accounting theory relevant to accounting practice proceeds from a cross-fertilisation of theory and practice, each needing the other for its healthy development. Further empirically-based research is therefore required to assess the application and relevance of management accounting theory to specific areas, such as the marketing function.

This leads to the question: 'Why are textbook methods not more widely applied in practice?' One reason may be that empirical research has not been able to demonstrate clearly that adoption of superior management accounting methods gives rise to better performance (for example, Haka *et al.*, 1985). Yet unless textbook methods pass the cost-benefit test, simpler techniques may prove equally robust and effective.

Dunk and Kenny (1983) investigated the usefulness of performance measures as perceived by marketing department managers and found that the vast majority of measures that marketing managers rated as significantly useful were non-accounting measures. Wilson and Bancroft (1983) found that while management accounting techniques used for product and price analysis were well developed, few techniques were used by accountants for predicting the effect of changes in the other aspects of the marketing mix. There ap-

peared to be many well-ingrained attitudes on the part of accountants which were prejudicial to marketing, with insufficient recognition of the contribution and importance of marketing to overall company performance.

If no evidence can be offered that textbook accounting methods are associated with superior performance this would suggest that one or more of the following applies:

- (a) the logical scope and the related operational theories upon which the techniques are developed are erroneous, or do not flow from reality;
- (b) the techniques are impractical or cost-benefit inefficient; or
- (c) the benefits from their adoption are insufficient to force busy managers to change from their traditional practices.

This paper examines the application of management accounting techniques to marketing. Specifically it considers:

- (i) the managerial accounting practices used within the marketing function in a highly competitive industry (the Australian food industry); and
- (ii) whether firms adopting the conventional textbook accounting wisdom outperform those firms employing other methods.

Research design

The findings of prior empirical studies, although mixed, suggest that the majority of accounting techniques and measures are not regarded as particularly useful in planning and control within the marketing function. One problem with these studies is that the samples were drawn from a wide range of industries operating within differing contexts. In selecting the sampling frame of the present

*The authors acknowledge the very helpful suggestions made by anonymous referees.

study, the first step was to try to remove the effects of the environmental factors. This was done by choosing just one industry. Wilson and Bancroft (1983) investigated the fast moving consumer goods (FMCG) industry. The present study went further by choosing the most competitive sector of the FMCG industry, that of food manufacturing and retailing, and by examining only one type of interrelationship, that between the finance and marketing functions. The major contingencies remaining, therefore, are those caused by internal factors such as organisation structure and management style. If the accounting techniques used to provide information to the marketing function lack technical sophistication in a particular company, this would primarily be due to the internal factors present in the finance function and the interrelationship between the finance and marketing functions.

The sampling frame was chosen by taking all Australian food manufacturing companies with over 50 employees. Questionnaires were sent to the finance directors in the 160 companies surveyed during May 1985. A total of 55 usable responses were returned—a 34.4 per cent response rate. In a recent review of response to industrial mailed surveys, Hart (1987) reports response rates varying from 17% to 60% with an average of 36%. The current response rate of 34% is directly in line with expectations and typical for this type of widely used research approach. Analysis of responses showed an acceptable spread of responses across the industry in terms of size of firm.

The questionnaire was developed after carrying out in-depth interviews with executives of 21 companies in differing segments of the Australian food industry. Selected questions were also incorporated from two important UK studies (Hooley, 1984; and Wilson and Bancroft, 1983) and one USA study (Rayburn, 1981) for comparative purposes. The full questionnaire, of which the questions addressed in this paper are a part, is given in Ratnatunga (1987).

Identifying Better Performing Companies

To test the economic effectiveness of textbook accounting methods in practice sample firms were divided into the better performing companies (the 'high fliers') and other companies (the 'also-rans'). This was done by using an index of net margin and three respondent performance perceptions. The 'high fliers' were selected by choosing companies that had a net margin (PBIT/Sales) greater than or equal to the mean and where the respondents had perceived that their company had performed 'much better' or 'better' than their competitors in at least two out of three performance measures—profit, sales volume and market share. The rationale for such an approach was twofold: firstly it combines accounting-based measures of per-

formance (net margin and profit) with marketing-oriented measures. Secondly, this approach has been accepted in the marketing literature (developed and presented in Hooley *et al.*, 1984 and Hooley and Lynch, 1985), with the idea of selecting 'high fliers' originating from the Peters and Waterman book *In Search of Excellence* (1982).

This procedure resulted in 15 companies (27.3%) identified as 'high fliers'. Separate frequencies were then generated for both the high fliers and also-rans for comparison with the total sample and to identify whether high fliers use the tools and techniques recommended by the conventional wisdom of accounting and marketing theory in significantly higher frequencies than the also-rans.

Results

The main questions of relevance to this paper were those that attempted to determine the level of sophistication of the finance function with regard to the application of accounting techniques for marketing. Many of the questions were similar to those raised by Wilson and Bancroft (1983), thus permitting useful comparison with UK practices.

Table 1 shows that the more common managerial accounting techniques and tools have a very high usage in providing information to the marketing function. The table provides information on regularity of use, awareness and intentions for the 22 accounting tools and techniques addressed.

Sales Forecasting

The finance function of a large percentage of firms seems to use sales forecasting techniques regularly to provide information to the marketing function. However, unlike many of the other techniques listed, methods of forecasting sales differ in their level of sophistication. Methods can vary from simple time-series trends to more sophisticated use of input-output concepts and Box-Jenkins models. What was evidenced by the questionnaire was that, similar to the findings of the Wilson (1983) study of FMCG Companies in the UK, the finance executives were of the view that there was a regular use of sales forecasting techniques in providing information to marketing. This finding goes against the practices observed during an earlier exploratory qualitative study (Ratnatunga, 1985) where the marketing managers interviewed indicated that forecasting sales was done very much within the marketing function. The only inference that can be drawn from these different views is that, whilst most finance functions did provide some time-series trends based on historical sales data, due to the extreme volatility of the food industry, the sales forecasts were far more sensitive to environmental information as

Table 1

Use of Accounting Techniques by the Finance Function in Providing Information to the Marketing Function

	<i>Wilson Study (UK)</i>	<i>Australian Food Industry (65 Respondents)</i>				
	<i>Approx. usage level</i>	<i>Use it regularly</i>	<i>Have tried it</i>	<i>Intend to use</i>	<i>Don't intend to use</i>	<i>Never heard of</i>
	%	%	%	%	%	%
Sales forecasting	High	78.2	5.5	7.3	9.1	0.0
Standard manufacturing costs	Above average	76.4	7.3	5.5	9.1	1.8
Standard marketing costs	Below average	25.5	10.9	5.5	49.1	9.1
Standard distribution costs	High	45.5	10.9	7.3	32.7	3.6
Budgetary control	Above average	96.4	0.0	3.6	0.0	0.0
Variance analysis	Below average	78.2	9.1	5.5	3.6	3.6
Periodic budgets	Average	63.6	9.1	3.6	20.0	3.6
Rolling budgets	Very low	27.3	12.7	7.3	38.2	14.5
Zero-based budgets	Nil	12.7	18.2	1.8	61.8	5.5
Fixed budgets	Low	76.4	5.5	5.5	12.7	0.0
Flexible budgets	Average	40.0	16.4	10.9	27.3	5.5
Ex post analysis	—	27.3	10.9	1.8	12.7	47.3
Full costing-net profit	Very low	58.2	9.1	0.0	29.1	3.6
Marginal costing-contribution	Very high	74.5	7.3	5.5	12.7	0.0
Break-even analysis	Low	38.2	32.7	7.3	21.8	0.0
Distribution cost accounting	Very low	23.6	14.5	1.8	40.0	20.0
Responsibility accounting	Very low	70.9	0.0	5.5	21.8	1.8
Segmental analysis	Low	61.8	5.5	5.5	21.8	5.5
Profitability analysis	Very high	74.5	7.3	7.3	9.1	1.8
Productivity analysis	Nil	52.7	12.7	5.5	23.6	5.5
Cost effectiveness analysis	Low	34.5	25.5	5.5	25.5	9.1
Others	—	7.3	—	—	—	—

supplied by marketing researchers within the marketing function.

Standard Costing

A standard is usually some achievable benchmark against which performance can be measured. Comparing actual performance with a standard is considered to be superior to comparing against past performance, because the latter may include past inefficiencies and at the same time not include changes in the operating environment. In general, empirical studies have found that most firms do use standard costs in the production area (Rayburn and Anderson, 1984, in the USA).

The use of standards for measurement in the marketing function has also been advocated (Miller, 1967) although not as comprehensively as their use in manufacturing. The chief argument against using them in marketing hinges on the difficulty of determining them with any precision. Shapiro and Kirpalani (1984) state that this argument can probably never be accepted or rejected in general terms; each firm must make its own decision as to the feasibility of using standard costs in marketing evaluation.

In the Australian food industry over three-quarters of respondents use standards for manufacturing costs but only one quarter use them for

marketing cost analysis. These results correspond to the Wilson (1983) study of British FMCG companies. Although physical distribution is considered of relatively little importance in the marketing mix of food companies (i.e. compared to product range, pricing and promotions), the use of standards in distribution costing is relatively high. This may be because these distribution costs are relatively easier to estimate and control in comparison with other marketing costs, and behave, to a large extent, like manufacturing costs.

This preliminary evidence suggests, therefore, that a large majority of food companies do not use standard costing in the marketing area. One cannot say if this is because standards are difficult to determine or simply because the exercise of generating marketing standards is considered not useful for planning and control. Whatever the reasons, the lack of use of marketing standards has significant implications in other areas of managerial accounting such as budgeting, variance analysis and responsibility accounting as discussed below.

Budgetary Control

A budget is a quantitative expression of a plan of action and an aid to co-ordination and implementation. Budgetary control, when administered wisely, is thought to have the advantages

of compelling management planning, providing definite expectations that are the best framework for judging subsequent performance, and promoting communication and co-ordination among the various segments of the business.

Budgeting approaches and budgetary control have received much attention in the marketing accounting literature (for example, Sizer, 1975; Lilien and Little, 1976; Schaffir & Orr, 1963; Friedman, 1971; Mitchell, 1979).

There are many types of budgets, the usual planning-and-control budget period being one year. Whilst Table 1 reveals that almost all companies use some form of budgetary control, only 63 per cent generate 'periodic' budgets (defined as a budget for a period less than one year). The percentage of companies that use rolling (or continuous) budgets (whereby a twelve-month forecast is always available by adding a period in the future as the period just ended is dropped) is very low (27%) as is the percentage that use zero-based budgets (12%). These results are very similar to Wilson's study of British FMCG companies, and indicate that even in a very competitive industry, a number of companies make plans only on an annual basis, and do not change plans within an operating year as the environmental conditions change.

When budgets are used for control purposes, there are two possible approaches to evaluating performance: fixed and flexible budgeting. Companies in the Australian food industry use fixed budgets much more regularly than flexible budgets. This also indicates that much of the variance analysis carried out is basically in calculating the master budget variance. This fact was established in another question in which only 21 per cent computed flexible budget variances. Despite the fact that flexible budget variance techniques have been available for over three decades and have a demonstrated theoretical superiority over master budget variances, they are still rarely applied to marketing.

The literature on variance analysis has gone a step further by recommending that, what should be calculated are ex post variances (Hulbert & Toy, 1977; Lusch & Bentz, 1984). Ex post variances are those generated by reformulating the budget so as to reflect what it would have been had the environmental conditions of the actual period been known at the budgeting stage prior to comparing with actual results. Only the very recent books on marketing accounting incorporate this approach and thus, if flexible budgeting is used by so few firms, the researcher expected the use of ex post analysis to be non-existent. However, 15 firms (i.e. 27%) indicated that they used this technique regularly (Table 1). Such a high response may well be due to a problem of definition. When ex post variances were defined at length in a later question

no respondent claimed that his or her company calculated such variances. Only 17 per cent of respondents stated that such variances should be calculated.

Costing Systems

In production accounting, there are two main costing systems, commonly labelled absorption (or full) costing, and marginal (or variable) costing. Absorption costing is the traditional approach, and signifies that the fixed factory overhead is inventoried, i.e. it is included as part of a product's cost. Marginal costing, in contrast, does not include in inventory the fixed factory overhead, but instead treats it as an expense within the accounting period. The net income figure will obviously differ under the two systems whenever the inventory level changes because the one charges all fixed manufacturing costs against revenue immediately whilst the other would have some of these costs remaining as part of the inventory (see Sandretto, 1985).

With regard to external financial reporting all professional rules and tax authorities insist that both fixed and variable costs be inventoried. However, for internal management reporting, the conventional wisdom of most text books (since Dixon, 1940) would be to use marginal costing because it recognises that costs behave differently when activity changes. Thus, in environments where volume changes are significant, and occur regularly, absorption costing is perceived as giving reports that are difficult to interpret (because fixed costs by definition do not change with changes in volume) and do not neatly dovetail with flexible budgeting and cost-volume-profit relationships.

Whilst the central issue between the two systems is one of determining what is the proper 'time' to recognise fixed factory overhead as an expense, other fixed costs (such as fixed marketing costs) also can enter the picture in a number of ways. First, whilst an absorption costing system can operate without attempting the separation of fixed and variable costs, this is an essential requirement under marginal costing. Thus under absorption costing, marketing costs need not be separated into their fixed and variable elements and so it will not be possible to provide CVP reports to the marketing function for decision making purposes (as suggested by Farris & Reibstein, 1979). If the absorption costing system does also recognise cost behaviour, then CVP analysis will be possible (see Solomons, 1968) but this is not the norm in most companies using full-costing.

Most managerial accounting textbooks do not address the inventoriable aspect of fixed marketing costs, because all marketing and selling costs (be they fixed or variable) are considered to be expensed during a period, being costs incurred in moving stock. Thus the argument is that no unsold

Table 2
The Extension of Marginal Costing Techniques

	<i>All Companies</i>	<i>High Fliers</i>	<i>Also- rans</i>
<i>Number of Respondents</i>	55	15	40
<i>Costing Systems:</i>			
Full Costing (used regularly)	58%	87%	47%
Marginal Costing (used regularly)	74%	67%	77%
<i>Marginal Cost Extensions:</i>			
BE analysis (used regularly)	38%	53%	32%
Segmental BE analyses (done)	44%	53%	40%
What-if analyses (done)	60%	66%	57%
Flexible budgets (used regularly)	40%	46%	37%
Contribution-based productivity (measured)	49%	60%	45%
Contribution-based pricing (done)	33%	40%	30%

item of stock could contain marketing cost. This view has been fiercely criticised by a number of authors who state that many marketing costs are actually assets and thus should be capitalised, especially those incurred in advertising (see for example Dean, 1966; Peles, 1970; Falk & Miller, 1977; Dhalla, 1978). If no marketing costs are treated as assets, then absorption and marginal costing will treat all non-manufacturing costs similarly. On the other hand, if certain marketing costs are recognised as assets, then an absorption costing approach will have to carry forward all such costs, whilst marginal costing will carry forward only the variable element of such marketing costs.

Finally, there is a cost-allocation issue. Under absorption costing all indirect costs (fixed and variable) will need to be allocated to the market segments of interest (usually products). Under marginal costing only the variable indirect costs need be allocated, and thus the subjectivity associated with cost allocations is reduced.

In summary, the marketing-accounting literature is overwhelmingly in support of using marginal costing for marketing reporting (see for example, Wu, 1975; Dunne & Wolk, 1977; Kallimanis, 1968; Betley, 1973). Marginal analysis has also been suggested in other marketing mix areas such as advertising (Brown, 1975), distribution (Updegraph, 1964) and credit management (Davis, 1966).

Table 1 shows that in the Australian food industry, in keeping with the conventional wisdom, a higher proportion of firms (74%) use marginal costing regularly as compared to using full costing regularly (58%). Despite this, only a minority of companies use break-even analysis techniques (38%) and flexible budgets (40%). In a direct question asking if break-even analysis is determined for each segment, a majority of companies (56%) responded negatively. Thus, many companies were not making use of an important planning and analysis technique which follows from

marginal costing. This is probably because CVP (break-even) analysis is basically designed for single-product, single-price enterprises, and many difficulties remain in adapting it to a multi-product enterprise (see Ratnatunga, 1983). Some of these problems can be overcome by conducting 'what-if' sensitivity analyses in the planning phase of operations, using models developed on computer spreadsheet packages, and a majority of companies (60%) stated that these are in fact conducted.

The cross-tabulation of marginal costing with break-even (BE) analysis showed that 46 per cent of companies use both techniques regularly. It also showed that 31 per cent of companies using marginal costing regularly had tried BE analysis at some stage. The fact that such a large number of companies had tried and abandoned BE analysis underlines the difficulties that companies face in practice in trying to adapt the technique to a multi-product firm.

The cross-tabulation of marginal costing with flexible budgeting also showed that 46 per cent of companies use both techniques regularly. However, in this case, only 19 per cent of marginal costers had tried (and abandoned) preparing flexible budgets, whilst 27 per cent had no intention of trying it. Thus, although 83 per cent of marginal costers calculated variances regularly, these were not flexible budget variances.

Amongst the high fliers the overall picture was different. Of the 15 firms selected as high fliers 13 (87%) generated full cost reports and 10 (67%) generated marginal cost reports regularly. However, as indicated in Table 2, the high-flying companies were more likely to extend marginal cost analysis to areas of planning (i.e. through break-even and what-if analyses), control (i.e. through flexible budgets and productivity analyses), and even pricing. The better performing companies seem to be using these marginal cost extensions more frequently than do the also-ran companies.

Table 3
Methods of Variance Explanation

	% Total Sample (55)	% High Fliers (15)	% Also- rans (40)
(a) Variances are not explained	10.9	13.3	10.0
(b) Accountants give narrative explanations after consultation with sections considered particularly responsible	58.2	66.7	55.0
(c) Total variances are decomposed to lower level variances and/or specific expense items	29.1	40.0	25.0
(d) Managers of the sections considered primarily responsible give narrative explanations	41.8	33.3	45.0
(e) Others	1.8	0.0	2.5

Responsibility Accounting

When budgets are co-ordinated with the accounting system that reports on actual events in such a way that individual manager responsibility is highlighted, we have a 'responsibility accounting system'. Thus, the type of benchmark cost (historical or standard), the type of budget (fixed or flexible), and the type of cost accounting system (full or marginal) will have a major impact on reports and how individual manager performance is evaluated. Standard costs and flexible budgets are regarded as theoretically superior when analysing variances (see Neth, 1966).

In the Australian food industry (Table 1), it was seen that only 40 per cent of companies used flexible budgets regularly, and an even smaller percentage (25%) had standard costs for marketing. Despite this, a large majority of respondents amongst Australian food marketing companies (71%) indicated that responsibility accounting techniques are used regularly in their companies. This was in contrast to a very low usage in British FMCG companies. Subsequent questions indicate that, although the degree of sophistication of the responsibility accounting techniques used in Australian food companies may not be high, some attempts are being made to make an individual responsible. In a question regarding methods of 'explaining' variances to management in terms of reasons for their occurrence, only 11 per cent of respondents stated that variances are not explained. The results are tabulated in Table 3.

As one can see from the overall totals, some of the companies that did explain variances used more than one method. The majority of companies had their accountants or sectional managers giving narrative explanations. Not many companies (29%) decomposed variances to lower level variances and/or specific expense items.

A large percentage of respondents (56%) stated that their company 'should be' generating flexible budget variances. This indicates that, although most companies presently use fixed budgets and

master budget variances, there is the general feeling amongst many financial executives that the variance reports they should be generating should take actual output into account. This attitude is in keeping with the suggestions made in the marketing-accounting literature on variance analysis (see Solomons, 1961; Arnstein, 1973).

Segmental and profitability analyses

There were some definitional problems evident in the responses to these two analysis techniques (Table 1). Segmental analysis tends to mean different things to finance people and marketing personnel. To a marketing person, segmental analysis is based upon market segmentation which involves dividing a larger market into a number of smaller markets on the basis of specified geographic, demographic or behavioural characteristics. To a finance man, segmental analysis involves assessing the worth of operating each identified physical segment such as a territory or a division (see Cravens *et al.*, 1972; Mossman *et al.*, 1974; Martin & Wright, 1974). This conventional finance point of view indicates that segmental analysis is an extension of profitability analysis, where the overall profit total is built up, segment by segment (Devos *et al.*, 1968).

In the Wilson (1983) study of FMCG companies in the UK, the respondents indicated that, whilst the usage of profitability analysis techniques was very high, the usage of segmental analysis techniques was low. This indicates either that a marketing definition was provided by the researchers for segmental analysis, or that the UK finance managers did not decompose the profit reports into segments of interest. In the present study (Table 1) the two techniques scored somewhat closer percentages of usage, indicating that most companies regularly using profitability analysis techniques also conducted segmental analyses. In fact, when the two techniques were cross-tabulated, 76 per

cent of companies responded that they used both techniques regularly.

Use of Accounting Techniques by High Fliers

Kendall's tau-B test was used to see whether frequencies of use of various accounting techniques was associated with better performance. Concordant associations (i.e. higher frequencies of use associated with better performance) were observed in the use of break-even analysis, flexible budgeting, standard manufacturing costs, standard marketing costs, variance analysis, ex post analysis, full costing, profitability analysis, productivity analysis and cost-effectiveness analysis. However, only one technique, that of full costing, was significant at the 0.05 level (tau-B = 0.31961; Signf = 0.0076). It must be pointed out that using full cost reports regularly did not mean that marginal cost reports were not used. Only 13 per cent of high fliers did not generate full cost reports, whilst 40 per cent of also-rans did not do so. Thus, many of the companies in the latter category do not know what their full cost of production is, and this raises questions regarding the approach used by them in pricing. These companies may in fact be accepting a price forced upon them by the stronger retailers, regardless of costs.

Discordant associations were observed in the use of sales forecasting, fixed budgets, periodic budgets, rolling budgets, zero-based budgets, standard distribution costing, responsibility accounting and segmental analysis. However, none was significant at the 0.05 level.

Thus when considering the use of accounting techniques in an overall sense, no significant differences could be found between the high fliers and the also-rans. However, such differences were found in the more searching questions asked elsewhere in the questionnaire (for example, as already noted, better performing companies were more likely to use fully the range of marginal costing techniques); but with regard to the general questions asked (Table 1) one cannot say that using a particular accounting technique more frequently has any significant association with better performance.

Summary

The primary focus of this study has been on the managerial accounting practices adopted within the marketing function in a highly competitive industry. If conventional textbook methods are superior in marketing decision making and control, such techniques should be more commonly found in better performing firms within competitive industries.

It was found that the finance function of most Australian food companies very regularly use the more common managerial accounting techniques

and tools such as sales forecasting, periodic budgets, budgetary control and variance analysis in providing information to the marketing function. However, fixed budgets were used with greater frequency than flexible budgets in the budgetary control area, and thus a very high percentage of companies generated only master budget variances. Most variances were explained narratively, with only about a quarter of the responding companies decomposing variances to lower levels. There was, however, a general feeling amongst many financial executives that the reports they *should* be generating are those using flexible budgeting techniques, i.e. more in line with text-book wisdom.

A high proportion of firms used the marginal costing approach, although many of these firms did not follow through and use CVP analysis for product planning and decision making. The better performing companies that used marginal costing as their primary reporting approach did, however, follow through by extending the use of these techniques in areas such as flexible budgeting, variance analysis, productivity measurement and pricing.

The overall observation is that only some techniques considered superior by the conventional wisdom of managerial accounting have found regular usage in this study. No evidence was found to indicate that better performing firms employ these techniques on a more regular basis. This may explain, in part, the gap between management accounting theory and practice observed in this and earlier studies. Further research is called for to identify a set of robust and cost-effective techniques which is appropriate to management accounting in the marketing area.

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An Analysis of the Reformed Corporation Tax: A Comment and an Extension

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Abstract—Mole (ABR, Autumn 1987) examined the effect of the change in the corporate tax system on investment in plant and machinery financed by retained profits. This comment questions the methodology used and the conclusions drawn. It also extends the analysis to investment from new equity finance and concludes that the new system creates less disincentive than the former one.

A recent article in this journal (Mole, 1987) examined the effect of the new corporate tax system upon new investment in plant and machinery financed by retained profits. The methodology was essentially to compare the tax burden, expressed as a percentage of net present value, under the old and new corporate tax systems. The main conclusions were that:

- (i) new investment financed wholly from retentions attracts an effective rate of taxation which, expressed in terms of net present values, need bear no resemblance whatsoever to the nominal 35% rate of corporation tax (p. 311),
- (ii) the tax burden on 'long-term' projects is increased the lower the value of the pre-tax profitability index (PPI), i.e. low yielding long-term investments are most heavily taxed! (p. 315).

This note argues that the methodology used in the article is inappropriate and that the resultant conclusions are not only without general significance but might also mislead the reader as to the implications of the changes in the corporate tax system.

To clarify the argument the following should be understood:

- (i) the old system of corporation tax involved 100% first year allowances (FYA) with a high nominal tax rate (52%); the new system adopts a 25% reducing balance writing down allowance (which we might assume is intended to approximate to economic depreciation) with a lower (35%) nominal tax rate.
- (ii) short-term projects are those with a five year or shorter life for which there is a de-pooling election available (FA 1985, s. 57), the effect of which is to allow write off of capital expenditure within the life of the project; long-term projects are those of a longer life attracting only normal writing down allowances (FA 71, s. 44), these allowances poten-

tially extending beyond the economic life of the project.

The first reservation as to methodology is with regard to the emphasis laid on the nominal corporation tax rates. These nominal rates include through the tax credit the basic rate personal tax so that when examining the changes in a corporation tax it is useful to exclude the personal tax burden which applies to all income whether arising from investment in companies or from other sources. We can thus establish the independent corporate tax rate—the rate of tax payable over and above that which would be paid on income in any event and which continues to be paid on income earned outside the corporate sector. At the time of the change in the system the basic rate of income tax (s) was 30% but has since fallen to 27%. Table 1 sets out the various tax rates under the two corporate tax systems. Whereas the nominal rate has fallen by 32.69%, the independent rate, (c), fell by 76.65% when s was 30% but only

Table 1
Corporate Tax Rates

Nominal (c_u)	Basic Rate Income Tax (s)	Independent (c)
52%	0.30	0.314
35%	0.30	0.071
35%	0.27	0.110

Notes: (1) the nominal rate is denoted as c_u as it represents the aggregate of the independent corporate tax and the personal income tax payable on undistributed corporate profits.

(2) the independent rate is equal to $1 - \frac{1 - c_u}{1 - s}$

¹That is, gross profits less profits net of corporation tax at the full nominal rate, grossed up at the basic rate of income tax to allow for the tax credit.

by 64.97% now that s has been reduced to 27%. As we shall see, it is the change in the independent rate which is most significant and the implications of such change are not always clear when only the nominal rate is considered.

The old system of corporation tax is commonly recognised as being equivalent to an expenditure tax under which the return to savings is not taxed. Government funds investment at the corporate tax rate (c , where investment is financed by retentions)² and obtains a return on its investment by taxing the subsequent cash inflows. Government and company each obtain the project's rate of return on their respective investments. Where the project is a marginal project with a net present value (NPV) of zero there is effectively no tax burden on the company;³ that is, the company is no worse off than if there had been no corporate tax system (assuming surplus funds can be invested at the same rate of return). However, where there is a positive NPV then government shares in the excess return and there is an effective tax burden since the company forgoes this part of the excess (and, assuming a tendency to equilibrium, cannot be assumed to earn this excess return elsewhere). The rate of the corporate tax burden, excluding any personal tax, will be the independent corporate tax rate, and it is perfectly appropriate to apply that rate to the NPV since it is only the returns in excess of the opportunity cost of capital that are taxed. Indeed the existence of super profits is one of the justifications for the retention of a corporation tax under an expenditure tax regime.

The new system of corporation tax is intended to approximate to an income tax so that both the normal and excess returns to savings are taxed. Assume at this stage that the capital allowances are exactly equivalent to economic depreciation, and consider a project with pre-tax NPV of a magnitude such that after tax the NPV equals zero.⁴ In such a case the tax burden, if expressed as a percentage of the pre-tax NPV , would be 100%. What is the significance of such a measurement?

²In fact the government investment is the independent corporate tax forgone on retained profits plus the basic rate personal tax forgone on the profits not distributed as dividend.

³This assumes that taxable profit is identical to net cash inflow. Depreciation does not affect this assumption but accruals and the realisation basis of revenue recognition may do.

⁴This assumes, as does the whole discussion, that the cost of capital does not change following the introduction of a corporate income tax. It is when the cost of capital is taken to remain constant that the capitalisation of the tax burden arises; i.e. a unit of share value is reduced from 1 to $(1 - c)$ where c is the independent corporate tax rate. If this assumption does not hold then the effect of a change in the corporate tax is very different: the cost of capital may, at the extreme, be reduced by a factor of $(1 - c)$ so that share value remains constant.

When what is subject to tax is all the returns, and not just the excess returns manifest in a positive pre-tax NPV , the comparison (conclusion (ii)) of this 100% with any rate of corporation tax, nominal or independent, seems meaningless. Similarly it also follows (assuming corporate tax rates of less than 100%) that the greater the pre-tax NPV the lower will be the average tax burden when expressed as a percentage of total NPV (conclusion (ii)). Such a conclusion, though, reflects only the laws of arithmetic; it tells us nothing about either the tax system, investment policy or, more crucially, the implications of the change in tax systems. If a measure of the tax burden of an income tax in present value terms (PV) is required then the PV of the tax burden is appropriately expressed as a percentage of the PV of the project before tax.

Before seeking to draw out the implications of such a change, a comment must also be made on the new writing down allowances. Above it was assumed that these exactly matched economic depreciation.⁵ Where this is the case the tax burden will equate to the corporate tax rate;⁶ otherwise there may be a difference, but the direction of that difference may vary. Consider, first, short-term projects. Clearly capital expenditure in the final accounting period will effectively attract tax relief equivalent to economic depreciation since the project is completed at the end of that period and the de-pooling election will allow 100% of the expenditure to be written off. However, it does not follow that the allowances given in respect of expenditure in the first accounting period over the life of the short-term project are less than economic depreciation; they may be but equally they may be greater than or equal to economic depreciation. All depends on what economic depreciation actually is and that depends on the timing of the subsequent net cash inflows. For example a short-term project might involve one initial expenditure at its commencement and one cash inflow at its cessation. In such a case tax relief through writing down allowances (assumed to be set against other income) would be received throughout the project but there would be no economic depreciation until its end (in

⁵Economic depreciation for a marginal project is defined as the change in present value of a project over the accounting period. There is no one correct measure of economic depreciation for a project with a positive NPV . Actual depreciation in any period will depend on when the NPV is considered distributable and this could be determined by behavioural norms such as conservatism. All that is required is that the cash equivalent to the initial investment is maintained at the end of the project.

⁶This ignores the effects of inflation and the lagging of tax payments. Both may be significant in reducing the effective rate of tax. Inflation is also significant in the opposite direction where income is the tax base and where no allowance is made for it in measuring income. The original article fully recognises these issues.

fact there would have been untaxed economic appreciation).

Similar considerations apply with regard to long-term projects. Early expenditures (incurred more than five years before the end of the project) may receive relief which is greater or less than that which would be given to economic depreciation. To say that early outlays are granted less relief (p. 315) than later ones is not a sustainable generalisation for either short or long-term projects. The only way to establish the effective tax rate for an individual project is to compare the pre-tax PV with the after-tax PV ; where the rate of reduction in PV is equivalent to the tax rate then, *ceteris paribus*, capital allowances will have been equivalent to economic depreciation.

What then are the implications of the changes in the corporation tax? Consider first projects financed solely through retained profits.

Let c = the original independent corporate tax rate

c^1 = the new independent corporate tax rate

K = the investment in a project

NPV = the pre-tax net present value of the project

PV = the pre-tax present value of the project.

In the case of a marginal project $K = PV$ and under the old expenditure tax equivalent corporation tax there is no tax burden. In contrast under the new income tax based corporation tax PV is reduced to $PV(1 - c^1)$ so that for any positive value of c^1 the new tax obviously results in a higher burden on marginal projects. However, this is not always so for intra-marginal projects with a positive NPV . Under the old system a unit of retained profit after tax $(1 - c_u)$ would by virtue of FYA have generated investment of 1 ($K = 1$) and, assuming subsequent distribution of the profits thereby generated, a capital gain before gains tax of:

$$(K + NPV)(1 - c) \quad (1)$$

Now a unit of retained profit after tax $(1 - c_u^1)$ will not attract FYA so that an additional amount c_u^1 will have to be raised to finance the same level of investment (K). The capital gain will, on the same assumptions as above, therefore be:

$$(K + NPV)(1 - c^1) - c_u^1 \quad (2)$$

(the term c_u^1 being deducted as an addition in the base cost of the share). Setting c and c^1 at the values in Table 1 for basic rates of 30% and 27%, shows that there is indifference between the two systems (expressions (1) and (2) are equal) when $NPV = 44.27\%$ or 71.57% of K respectively. The clear implications are that, in comparison with the old, the new system could actually be beneficial to projects financed from retentions which have a very high NPV ; but that reductions in basic rate

without corresponding reductions in the corporation tax have made this less likely to be the case.

Whether or not a project is now worth undertaking when financed by retentions cannot be determined only by reference to the corporate tax rate; assuming an objective of maximisation of shareholder wealth, the differential personal taxes have to be taken into account as well, since the alternative to retention (which attracts capital gains tax on realisation by the shareholder) is distribution which attracts income tax. Failure to do this will seriously overestimate the attractiveness of financing projects through retentions. For example, a unit of retained after-tax profit would seem to require a PV of $1/(1 - c^1)$ (at rates of NPV of 0.076 or 0.124, for $s = 0.3$ or 0.27 respectively). However, this ignores the capital gains tax liability that would arise on realisation of the gain by a shareholder (assumed to be immediate⁷ in order to compare with the alternative of a dividend). If the shareholder is a basic rate tax payer he could receive a unit of after-tax (at the rate c_u) profit as dividend without further tax liability. To realise a gain of equal amount would require a PV of the retention of $1/(1 - c^1)(1 - g)$ (a rate of NPV of 0.538 or 0.605 for $g = 3$ and $s = 0.3$ or 0.27 respectively).

Generally, therefore, the value of retained profit after all taxes has to be compared with the dividend forgone after all taxes. Thus a unit of before tax profit may be retained in the sum of $(1 - c_u^1)$ and will be valued on the market, assuming the project to be marginal, at $(1 - c_u^1)(1 - c^1)$, reducing after gains tax to:

$$(1 - c_u^1)(1 - c^1)(1 - g) \quad (3)$$

The alternative is to receive a dividend in the sum of

$$(1 - c^1)(1 - m) \quad (4)$$

where m is the shareholder's marginal income tax rate. Indifference between these alternative therefore arises where

$$(1 - c_u^1)(1 - g) = (1 - m) \quad (5)$$

i.e. where $m = 0.545$ when $g = 0.3$, or 0.35 when $g = 0$. Clearly the incentive to retain profits is now much less than under the old system ($m = 0.3$)⁸ for those investments which attracted FYAs, but greater ($m = 0.664$)⁸ for those investments not previously attracting these allowances.

To establish the rate of NPV per pound of outlay (npv) necessary to make a shareholder

⁷This assumption overstates the real rate of capital gains tax since on realisation of retained profits the shareholder will be taxed on the basis that he has realised part initial investment and part retention. Tax on the remaining retention will then be delayed.

⁸See Macdonald (1981) p. 52, Table 3.

Table 2

<i>m</i>	<i>npv</i>	
	<i>g</i> = 0.3	<i>g</i> = 0.0
0	1.198	0.538
27	0.605	0.123
30	0.538	0.077
40	0.318	-0.077
45	0.209	-0.154
50	0.099	-0.231
55	-0.011	-0.308
60	-0.121	-0.385

indifferent between retentions and distribution, we solve for *npv* in the equation

$$(1 - c^1)(1 + npv)(1 - g) = (1 - m) \quad (6)$$

for possible given values of *m*. Table 2 shows the values for *npv* given *g* = 0.3 or 0.

To some higher-rate taxpayers the new system still favours retentions, but for most the system now favours distributions unless *npv* is high, or, more significantly, (given indexation and the exempt amount) unless *g* = 0 when *m* is positive.

The change in corporate tax also has implications for the financing of investment through new equity. Under the previous system the FYAs were not available on such investment because there would have been no profits. Instead they were carried forward as losses and offset against subsequent profits so that for a marginal project no tax was paid for *n* years where *n* equals $1/r$ and *r* is the opportunity cost of capital. Assuming distribution of income a marginal project thus had a value $K(1 - c/(1 + r)^n)$. Similarly a marginal project under the new system is valued at $K(1 - c^1)$. Indifference occurs when

$$c^1 = c/(1 + r)^n \quad (7)$$

which at Table 1 values requires $(1 + r)^n$ to equal 4.42 or 2.85 for values *s* = 0.3 and 0.27 respectively. However, the highest value that the expression can take as *r* becomes ever nearer zero is 2.718(*e*) so that with positive rates of return indifference cannot occur. The new low independent rate is preferable (gives a higher after-tax *PV*) than the old high rate with FYAs. The new system therefore favours externally financed investment more than the old. This analysis is, however, incomplete given the wealth maximisation assumption: it has been assumed that the new marginal investment is undertaken notwithstanding that as compared with investment in the non-corporate sector there is an immediate reduction in the value of equity by a factor of $(1 - c^1)$. Such an investment is not optimal.

For a project to be marginal after tax its after-tax *NPV* (which is fully taxable under both capital allowance systems) would have to equal the tax

burden on the before-tax marginal project. Thus under the new tax a project would require a before-tax *NPV* such that:

$$NPV(1 - c^1) = Kc^1. \quad (8)$$

This requires an *npv* of 0.076 or 0.124 for *s* = 0.3 or 0.27 respectively. Similarly under the old system a project's *NPV* before tax would have to give

$$NPV(1 - c) = Kc/(1 + r)^n, \quad (9)$$

or

$$\frac{NPV(1 - c)}{K} = \left(\frac{c}{1 + r}\right)^n. \quad (10)$$

The term NPV/K is the rate of *NPV* per pound of outlay (*npv*), so that by setting that at the values at which projects under the new system have been shown to be acceptable, and taking the value for *c* from Table 1, we find the expression $(1 + r)^n$ would have to take values of 6.04 or 3.69 for *s* = 0.3 or 0.27 respectively. As noted above the highest value that the expression can take as *r* approaches zero is 2.718.

Thus externally financed projects (the income from which is distributed) which after tax are now acceptable at the margin are those which should have been rejected under the old system of corporation tax. For projects with a higher *NPV* the new system clearly taxes the increase in *NPV* at a lower rate than the previous system. The general conclusion is therefore that for new companies with projects with a positive pre-tax *NPV* of $K[(1/1 - c^1) - 1]$ or higher, the new corporate tax system is preferable.

In an environment of rapidly changing technology high *NPVs* might well be expected on intra-marginal projects. The new tax might therefore be expected to encourage the financing of new corporate ventures more than the previous one.

1988 Budget postscript

The reduction in basic rate to 25% while retaining the 35% corporation tax rate has again increased the independent corporate tax rate. This is now 0.133.

The reform of capital gains tax, whereby gains are taxed at the marginal income tax rate, clearly reduces the tax incentive to retain profits rather than distribute them. However, it does not eliminate the incentive because the retention of the exempt amount means that a quite substantial amount of gains will still be tax free, i.e. *g* = 0.

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Matrix-Based Accounting: A Comment

M. J. Mepham

Abstract—This article develops some of the points made by Leech (1986). Leech's historical survey of matrix accounting is extended by noting De Morgan's (1846) early description of this model. The author agrees that developments in database theory make the matrix model particularly appropriate and a link is suggested to Sorter's (1969) events accounting paradigm. Events accounting requires a new canonical model if its full potential is to be realised. The matrix model could fill this roll by providing a set of windows, giving alternative views of the contents of an events accounting database, and the convenient interface to spreadsheet type financial models which was noted by Leech.

Introduction

In a timely article Leech (1986) provides (1) a useful historical review of the literature on matrix accounting, (2) a matrix accounting system which gives the same facilities as conventional systems whilst allowing a more convenient interface with budgeting models, and (3) a re-examination of the relevance of the matrix framework for accounting models.

This note will comment on each of these areas. In particular it will: (1) draw attention to the 19th century origins of matrix accounting, (2) argue that the matrix framework can provide a more flexible and improved accounting system giving not only a natural interface to planning models but also moving the system towards the events accounting paradigm (Sorter, 1969) and (3) suggest that matrix notation is suitable for a new *canonical* model for accounting.

The origins of the matrix model

In 1846, Augustus De Morgan introduced a matrix framework for accounting in an appendix to the 5th edition of his *Elements of Arithmetic* ('Appendix on the Main Principle of Book-keeping', pp. 180-189). After a preliminary description of the conventional form of T account, he writes:

Suppose, for example, that there are five accounts, A, B, C, D, E, and that each account has one transaction of its own with every other account; and let the debits be in the columns, the credits in the rows, as follows:

	A, Debtor	B, Debtor	C, Debtor	D, Debtor	E, Debtor
A, Creditor		23	19	32	4
B, Creditor	17		6	11	25

C, Creditor	9	41		10	2
D, Creditor	14	28	16		3
E, Creditor	15	4	60	1	

Although De Morgan's discussion of book-keeping has been described as '... probably the most influential piece of writing to be found in the nineteenth century' (Jackson, 1956, p. 298) the matrix approach was not used by other textbook writers, and a gap of more than 100 years separates De Morgan's introduction of matrix accounting from its reappearance as a topic of research interest in the 1960s and 1970s.

Events accounting and the matrix model

Leech notes that the 1970s interest in the matrix framework waned in the early 1980s. He suggests that this is because it was soon apparent that a transaction matrix, whilst being very appropriate for summarising transactions, was inappropriate for recording transactions. Leech recognises that database developments have made it possible to overcome this difficulty and he describes a system in which 'a matrix of ex post account balances is produced from the normal processing of transactions through the accounting sub-systems, and, at the same time, the details of each transaction are stored on disk' (p. 337). Leech also notes that '... relational data base management systems are now being used to develop integrated accounting applications' (p. 327), but he does not expressly consider the potential advantages of relational database accounting and how these might be enhanced through the use of a matrix framework.

Sorter's suggestions for improving accounting information systems are given in an important 1969 article. In this paper he criticised the conventional view which regards an accounting system as providing standardised inputs for the end user's

known decision models. He argued that '... it is impossible to specify input values that are optimal for the wide range of possible uses' (p. 13). He proposed an alternative Events Approach which suggested that '... the purpose of accounting is to provide information about relevant economic events that might be useful in a variety of possible decision models.' Sorter argued that this approach sees '... the function of accounting at one level removed in the decision-making process...' allowing (or requiring) '... individual users to generate their own input values for their own individual decision models' (p. 13).

Sorter did not consider the mechanics of implementing an events accounting system but his suggestions were followed up by a series of articles from researchers at Purdue and Carnegie-Mellon Universities (Colantoni, Manes and Whinston, 1971; Lieberman and Whinston, 1975; Haseman and Whinston, 1976). These writers proposed a database approach.

In a database events accounting system, event records would be stored in *disaggregated form* in the database and extracted and processed as required. The change in emphasis represents a fundamental move from *account* based procedures, which aggregate data within accounts, to a *view* based system which allows end users to obtain alternative views of the disaggregated data.

A relational system (Codd, 1970) would provide considerable flexibility. The data available to a relational database events accounting system would not be confined to records of past transactions and the commonly recognised (financial) attributes of such transactions. Details of (anticipated or budgeted) future events could be included and also other useful data such as appropriate statistics and details of orders placed and received, insurance records, plant registers etc. Some of this data would be recorded in associated sub-systems since the accounting system would be part of a more general Relational Management Information System. The Database Management System (DBMS) would provide the means of integration, giving a flexible method of combining such data with the more traditional accounting data.

In such a relational system there would be a need to safeguard the integrity and completeness of the (more narrowly defined) accounting data. A transaction matrix could be used for this. Consider a relational table (or file), JOURNAL, with attributes (or fields): Trans_No (transaction number), Date, Dr_Acc, Cr_Acc and Value (for recording the conventional details of transactions). A Transaction Matrix could readily be prepared from such a relation by using the Dr_Acc and Cr_Acc attributes to identify the appropriate columns and rows of the matrix. Conversely, as Merrett (1984, pp. 351-364) proposes, such a matrix can, quite naturally, be represented by the relation.

JOURNAL would be the simplest form of the traditional accounting system when this is translated to a database setting. At suitable intervals appropriate applications programs would generate the customary accounting statements (Balance Sheet and Profit and Loss Account) by summing the rows and columns of this matrix as Leech describes.

The matrix framework has other uses. When an end user interrogates a relational database the system typically provides relevant information in the form of two-dimensional tables. In a relational database events accounting system, some of the alternative views could be variations of the Leech/De Morgan Transactions Matrix. The system need not, however, be restricted to such 'input output' tables, it could provide a wide range of alternative views such as the following:

	Columns	Rows
Monthly Profit and Loss Account	Budget, Actual Variance	Types of Expense and Income
Expenses of Cost Centres for a given period	Cost Centres	Types of Expense
Cost Report for a given Cost Centre for several months	Months	Types of Expense
Contract Costs Report for a given Cost Centre	Individual Contracts	Types of Expense

This is a natural way to provide accounting information and the tables are immediately recognisable as conventional accounting reports. They are also clearly matrices. Since a relational database events accounting system is not restricted to the conventional financial data, other less traditional tabular reports could be prepared by using the DBMS query and report generating facilities to access and combine tables from other sub-systems with tables in the accounting database. The matrix framework provides windows each of which gives an ordered tabular view of a portion of the disaggregated data in the database. This can be contrasted with the T account model which analyses and summarises a restricted subset of the data in a linear fashion to produce the balance sheet and profit and loss account as end products. The events accounting system will also provide the conventional financial reports when such a view is requested but the underlying data remains unaffected and it can subsequently be accessed (with other relevant data) for other purposes and processed in other ways.

Interface with budget models

Financial planning and budget models make considerable use of the matrix (spreadsheet) frame-

work. Leech points out that, for some approaches to financial planning exercises, a transaction matrix can be used '... as direct input into financial modelling packages ...' (p. 337) thus avoiding the necessity of re-keying in data which frequently occurs in practice. Where such models use linear or goal programming (or similar optimising) techniques the matrix framework is again relevant as such models are conveniently described in matrix terms (Mephram, 1980).

Data models

The enthusiastic assimilation of spreadsheet packages into the accountant's tool kit has encouraged the erroneous assumption that financial modelling's role is primarily in the realm of planning and 'what if' budgeting. There has been little recognition of the fact that models are fundamental to accounting.

The position is better appreciated by information system engineers. A database information system is a physical model of reality but database theory emphasises the importance of a parallel conceptual model, *the data model*. McCarthy writes: 'A data model is intended to be a description of the logical structure of the object system as seen by the community of database users. It is a schema that represents, with data, the organization of the conceptual world of interest.' (1979, p. 668).

In the past, accountants have not separated the conceptual accounting data model from the techniques and tools that they use (the physical model) but now a wish to emphasise this distinction is commonly expressed. Accountants, and accounting academics, now frequently claim that the conversion from manual to computerised information systems is merely a change of the recording medium which requires no change to their conceptual T account data model.

A data model is not an optional extra in accounting. The distinguishing feature of accounting is its data model and there is a need for agreement on a *canonical* (i.e. a standard) version of it. Leech (p. 330) notes that Mattessich considered the 'matrix formulation' in this way in 1957. Since 1957 the development of relational database systems has made the framework even more suitable. Although the conceptual canonical accounting data model should be independent of the hardware on which physical systems are maintained, developments in technology create new opportunities for extending the facilities offered by information systems and it is important that this should be recognised and facilitated by the model. It is possible to continue with the T account model derived from hand written books but this is potentially damaging as it ties the conceptual model to a form of record keeping which is rapidly becoming obsolete and unduly restrictive when its capabilities are com-

pared with those obtainable from more advanced database technology (Harper, 1985; List, 1986). Technology should facilitate the development of accounting theory and practice but adherence to an outdated paradigm inhibits this.

Conclusion

Even before the computer revolution, the T account model was inappropriate as a description of the firm's accounting information system. With the recent database developments it is even less suitable. Batch file-based accounting systems will increasingly be converted to distributed on-line database accounting systems within comprehensive management information systems. The database-centred view emphasises end-user computing and the need to provide the user with convenient methods of specifying the views that he requires.

The usefulness of the matrix framework has already been proved for financial planning. It is possible that the adoption of matrix notation for the new canonical accounting model will facilitate the integration of financial and managerial accounting (Forrester, 1984), the development of multi-dimensional accounting (Ijiri and Kelly, 1980), the move to an events accounting system (Sorter, 1969) and the wider use of appropriate mathematical techniques (Mattessich, 1964; Mephram, 1980).

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Book Reviews

The Laws of Distributable Profits. *Andrew McGee and Michael Mumford.* Certified Accountant Publications, 1988. 39 pp. £6.00.

This useful short monograph by two research fellows of the International Centre for Research in Accounting at the University of Lancaster summarises rules for determining distributions, profits and distributable profit within the context of the British Companies Act 1985. British laws about distributable profit were substantially changed in the 1980 Companies Act (later consolidated in the 1985 Act) which gave effect to the requirements of the EC Second Directive. The most important change was that distributable profit was defined to be a company's accumulated realised profits (so far as not previously divided) less its accumulated realised losses (so far as not previously written off) thus dispensing with a long series of controversial legal decisions beginning with *Lee v. Neuchatel Asphalte Company* (1889).

The monograph contains a legal analysis written for accountants of the relevant provisions of the 1985 Companies Act. The authors also link these provisions to applicable case law, and indicate which of the pre-1980 dividend cases are now superseded. There are nine short chapters covering the nature of a distribution, the meaning of profits and distributable profit, the relevant accounts to be used in calculating the latter, special dividend restrictions on public companies, directors' duties and the consequences of unlawful distributions. Practitioners may find especially useful the discussion about the responsibilities of the company and of its directors for distributions.

However, the most interesting material appears in chapters 3 and 4 which discuss the meaning of profits and distributable profit. The authors explain that no clear definition of profits has emerged from case law, and the exact meaning of the realisation concept (at the heart of distributable profit) has yet to be clarified by the Courts. However, the authors do not go on to analyse how the terms 'profit' and 'realisation' have been treated in accounting theory. That is unfortunate because the 1985 Companies Act does not provide a complete definition of distributable profit. Aside from rules for a few items like revaluations, depreciation, provisions and developmental costs (treated well in the monograph), the 1985 Act states that realised profits will be those so determined under generally accepted accounting principles. Presumably these principles mean rules contained in British accounting standards. The authors are

quick to point out that while accountants' views about realised profits will be of importance in any future litigation, these views will not be binding on the Courts. Perhaps that is just as well given accountants' confused ideas about realisation. Nevertheless, the British accounting profession did issue Guidance Statements TR481 and TR482 in 1982 on realised profits and distributable profits, and it is a pity these documents were not discussed in the monograph.

The link between accounting standards and distributable profit emerging from the 1985 Companies Act's provisions, and the effectiveness of that link, are of interest in assessing how well distributable profit—a legal concept—can be accommodated within accounting theory. While most authors, including McGee and Mumford, accept distributable profit as a viable accounting concept, there is a view in the literature, for example Egginton's paper in the Winter 1980 issue of this journal, that distributable profit serves no useful purpose and should be abandoned as an accounting concept. Whether distributable profit can be successfully linked to the rules in accounting standards may provide evidence to assess Egginton's contention.

In conclusion, accountants who wish to gain a concise, intelligent summary of the laws of distributable profit in the 1985 British Companies Act will find McGee and Mumford's monograph useful.

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Richard D. Morris

Standard Setting for Financial Reporting. Peat, Marwick Main, 1987. iii + 140 pp.

This volume 'provides a record of the two after-dinner addresses and the 17 papers . . . presented at the AAA-KMG International Conference on Standard Setting . . . 1986'. The conference's organisers, Steve Zeff and David Solomons, provide a foreword and introduction, respectively.

From the tone of the remarks of the organisers and from my own impressions from meeting the delegates, the conference seems to have been enjoyable (how would one define 'successful?'). However, as with most conferences, I expect that the discussions in and out of the sessions were the most valuable parts of the conference: naturally the book does not include these.

The papers themselves are, in most cases, brief and unsurprising. Even the papers by academics tend to proceed by assertion and anecdote rather than by detailed analysis and references. There are exceptions to this: for example, Whittington, Renshall and Van Hulle provide substantial analyses; Whittington and Beaver provide references; Lev argues elegantly.

In summary, the book provides a good, light read but leaves a feeling of frustration in that it is probably much less informative and exciting than the conference was.

University of Reading

Christopher Nobes

Financial Reporting by Local Authorities in Scotland. *Linda Kilgour and Irvine Lapsley.* The Institute of Chartered Accountants of Scotland and the Chartered Institute of Public Finance and Accountancy, 1988. 68pp. £7.50.

In British local authorities, matters of finance and accounting are inextricably bound up with each other. Because of the statutory balanced-budget requirement, each debit and credit in the revenue accounts determines, sooner or later, the taxes that are levied. The introduction of the poll tax would place this effect on stilts.

Studies of local authority accounting practices are important for other reasons, but it is this central feature of British local authorities that elevates studies such as this one above the run-of-the-mill surveys of published accounts. The study, which concentrates on Scotland, is based on three exercises: an examination of published annual accounts; two reports that summarise the findings of Scottish local authority auditors; and a survey of the views of finance officers and auditors. The result is a full account of which practices are adopted, supported by plausible reasons why.

The basic finding is that practices are very diverse. The authors acknowledge that this is not peculiar to Scotland and that the diversity is not new. They point to very different treatments of central establishment charges and inventory, for example. They concentrate particularly on capital expenditure and identify a number of creative ways of influencing revenue accounts: advancing or delaying capital payments, capitalising expenditure normally expensed, use of reserves and provisions. They conclude:

... perhaps the single most challenging problem is that of the treatment of local authority capital expenditure, which is quite unique and, by commercial standards, idiosyncratic (p. 24).

One might quibble with the second adjective used to describe capital accounting and one might

argue with the implied superiority of best commercial practice, but the basic conclusion must be right. From this, the study turns to a discussion of the standard-setting context. They report that central government has a major role to play in setting the framework of accounting but that the profession has also offered more detailed guidance. And while auditors and finance officers do not appear to want the government to play a bigger role, it also appears that the profession's guidance is seen to be only moderately effective (p. 48).

Basically because of the diverse accounting treatments highlighted earlier, the study concludes that the present standard-setting arrangements need changing. Hope is held out that the profession's latest attempt to produce a comprehensive framework of accounting will provide the best solution.

The final section of the study concentrates on the broad form of financial reporting adopted and the extent to which performance measures are reported. On the first point, the study notes that most Scottish local authorities now produce a 'modern-style report and accounts' (p. 54) and typically provide greater disclosure than the minimum required of them. On the second point, the authors once again found diverse treatments, compounded by the differing treatments already mentioned.

The study is the first part of a two-part programme of research. The second part will consider users and users' needs, and is predicated on the notion that:

an essential component of well-founded reforms of financial reporting practices rests on the identification of principal users of such reports and a careful evaluation of their needs (pp. 3/4).

It is doubtful whether the academic literature would agree with this statement; the current consensus seems to be that identifying the incentives of policy-makers is a more useful approach. But more importantly, the first part of this research programme does not point, in this reviewer's mind at least, to a users or users' needs study. There is indeed undoubted diversity in reporting practice. If there are users of financial reports out there, and they wish to compare different authorities, it is likely that the reports would be more relevant and more reliable if they were more uniform.

But local authority accounting practices determine taxes. Changing accounting practices means changing taxes. This might be the best explanation of why practices are so diverse. And why they are likely to remain so, regardless of what 'users' might or might not 'need'.

This is not to suggest that the second part of the research is redundant; only that it is doubtful whether it will contribute much to the problem of

diversity in accounting practice that the first part so graphically demonstrates.

University of Birmingham.

Rowan Jones

Audit Committees. *Ian F. Y. Marrian.* Institute of Chartered Accountants of Scotland, 1988. 44 pp. £5.

Interest in the subject of audit committees ought to be as high now as it has ever been. Professional accountancy bodies have indicated support for their introduction in public companies, their possible value has been reviewed in the context of European Community plans to regulate in the area of auditor independence, and other questions over broader aspects of financial reporting and directors' behaviour provide a climate in which the structure of corporate governance in the UK could be reassessed. There can be little doubt, therefore, about the timeliness of research on the current role of audit committees, and Ian Marrian's booklet will be relevant to anyone with an interest in this subject.

The report is based on the responses of 451 of the *Times 1000* companies to a survey on the existence of audit committees together with follow up interviews with 59 companies regarding their role and value. Comments on the research can be structured around these two themes of existence and role.

The statistics quoted on the extent of existence of audit committees are helpful. From the responses to the survey it seems that only 17% of *Times 1000* companies have audit committees. The report outlines a fairly steady growth in the number over the ten years up to 1985, but the attempt that is made to link the formation of 12 committees in 1978 with a 1977 submission to government by the Consultative Committee of Accountancy Bodies seems rather optimistic given that the 1978 incidence is not so unusual when compared with that quoted for 1980 (10) or 1988 (11). Also, what is not clear in the report is what types of company have audit committees and whether there are any factors which distinguish those who do from those who do not.

Research findings on the role and contribution of audit committees are potentially most significant to the debate on their extension. The study sets out a variety of ways in which audit committees have been used. It is, however, difficult to draw general conclusions from these comments as often they appear to be based on the experience of only one or two individual responses, and also individual committees may be quoted a number of times. No evidence is provided of the extent of allegiance to various assertions regarding value.

One interesting aspect of the documented findings is that so few of the responses on role and value appear to be directly audit-related. There also appears to be some disparity between the committees' formal terms of reference and the way their value was discussed by the interviewers. The principal impression that is given is that the audit committee is seen as a means of giving a meaningful role to non-executive directors. It is as if some companies feel an obligation to have non-executives, but are unsure how to use them and introduce an audit committee as a vehicle for formalising their role. This role may work well in practice, but it does imply that most committees have not been formed out of audit-related concerns. If true, this would have implications for consideration of the potential of audit committees in relation to issues of auditor independence and more general corporate governance. For example, in only a few cases did the audit committee have any responsibility regarding audit fees.

The booklet has probably been written with an intended audience of directors considering introducing an audit committee and should be evaluated primarily against this purpose. It attempts to promote audit committees and even includes a 'model' constitution. Reading the findings, directors should conclude that an audit committee could serve a variety of purposes, many of them broader than audit matters.

As regards assisting our understanding and evaluation of the contribution of audit committees to the underlying issues of auditor management relationships and corporate governance, the study is more limited. The views of company management are documented but the principal research questions of how the existence of an audit committee affects the internal workings of a company, how companies without audit committees deal with the same matters, and what role the committees play in dealing with conflict, particularly between auditors and executive management, remain open.

University of Manchester

Stuart Turley

Banking in the EEC, 1988: Structures and Sources of Finance. *Ann Hendrie (ed).* Financial Times Business Information, 1988. xv + 270 pp. £76.00, pbk.

In 1957, the Treaty of Rome envisaged the creation of a single European economy. The deadline is now 31 December 1992!

In 1965, a White Paper was published recognising the key role that cross-border banking would play. The European Commission set out a timetable for completing the internal market incorporating all the measures needed to ensure com-

pletely free circulation of persons, goods, services and capital among all the member states. A Second Banking Directive, proposed in 1988, constitutes the final step towards a common market in banking.

During the next few years a great many domestic measures will need to be implemented if the deadline is to be met. This book, *Banking in the EEC, 1988*, provides a comprehensive legal, financial and monetary directory of banking structures and sources of finance in member states. It is a major work bringing together a great amount of material in a digestible form informing the reader of banking practices and the financial institutions responsible for the implementation, supervision and transmission of banking and financial services.

Each chapter covers an individual member state and incorporates the latest information on the process of change in banking practices especially *vis-à-vis* member states. Much change has already occurred. The book makes clear that in 1977 the First Banking Directive had been adopted, permitting banks to open branches or subsidiaries in all member states on condition that the rules of the host country were observed ('freedom of establishment'), and requiring member states to set up a licensing system for credit institutions, with minimum general standards for a 'fit and proper' test for authorisation.

However, the major changes will occur with the implementation of the Second Directive which introduces the concept of a single banking licence, founded on the principle of home country control, so that a bank established in a member state can open a branch in another member state without any authorisation from the host country, and the supervisory authority of the country of origin is solely responsible for prudential control. (Subsidiaries would be subject to the 1983 EEC directive on consolidated supervision.) The single community banking licence will

be valid for a range of activities including leasing, portfolio management and advice and trading in securities, as well as taking deposits and making loans. Agreements on harmonised bank capital bases and solvency ratios will follow.

The book points to a number of difficulties that may well emerge. First, the principle of home country control means that any activity permitted in the bank's home country, such as trading in securities, is automatically valid in the host country even if this activity is not open to domestic banks. Therefore, banks in countries like Greece, Portugal and Spain, which have tight restrictions on the financial services they can offer, may have to press for their domestic rules to be changed. Second, it is proposed to allow banks from outside the Community to set up subsidiaries in the Community only if their own banking authorities offer reciprocal access to banks from all EEC countries. This would mean that the UK authorities, for example, would not have the right to let in a third country bank which had refused reciprocal access to, say, Greek or Italian banks.

The editor of this book has brought together, through a large number of contributors, the key elements of domestic banking structures in member states. There is a great deal of information contained in the 270 pages, and maybe the next task is to tabulate the information and produce a book of comparative analysis of banking structures and sources of finance in the EEC. This would be a valuable addition. For the moment, this book is a welcome addition to the new emphasis on finance in reference books. Banking and financial structures are going through enormous changes, and books such as this need to be published if the dramatic and far reaching changes are to be monitored and the world of banking recognised for its major impact as the engine oil of EEC activity.

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Volume 18 Number 72 Autumn 1988

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The Institute of Chartered Accountants in England and Wales

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ISSN 0001 4788

ACCOUNTING AND BUSINESS RESEARCH

VOLUME 19 NUMBER 73 WINTER 1988

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The Adoption of Consolidated Accounting in Great Britain

Paul Bircher*

Abstract—Existing literature suggests that the principle of consolidated accounting gained widespread acceptance in Britain during the 1930s. The study reveals that there was little use of consolidated accounting in practice prior to 1945. The prolonged divergence between practice and opinion as to best practice is discussed with reference to both the divorce of ownership from control and the changing perceptions of the nature of shareholders. Finally the widespread adoption of consolidated accounting prior to the Companies Act 1948 is discussed with reference to the impending legislation to enforce group accounting, changing perceptions of the social obligations associated with corporate accounting and several specific events in the corporate environment that may have created incentives to provide consolidated accounts.

Introduction

The first legal requirement in Britain that companies should provide group accounts was contained in the Companies Act 1947 (CA 47). This statute gave effect to the recommendations of the company law amendment committee, the Cohen Committee, whose report was published in June 1945. However, the accounting provisions of CA 47 never came into operation and the legal requirement to provide group accounts finally became effective from 1st July 1948 with the introduction of the company law consolidating act, the Companies Act 1948 (CA 48).

By the time of the Cohen Committee inquiry the principle of group accounts, and specifically consolidated accounts, had gained wide acceptance. *The Accountant* (4th November 1944, p. 230) records that:

almost complete agreement has been found among witnesses giving evidence to the Company Law Amendment Committee on the desirability of compelling companies with many subsidiaries to issue consolidated accounts.

However, this consensus had only developed since the report of the previous company law amendment committee, the Greene Committee, (1926). Their report stated (para. 71) that the Committee could not support demands made by some witnesses that the publication of consolidated accounts be made compulsory. The matter should be left to the shareholders to make such requirements as to the form of their company's accounts as they may think proper. Kitchen (1979, p. 117)

notes that, on the evidence before them, there is little doubt that the committee were justified in finding as they did.

Accordingly the provisions of the Companies Act 1929 (CA 29) relating to group accounting were very limited. Section 126 only required that a holding company should state in its balance sheet how the aggregate profits and losses of subsidiaries had been treated in the holding company accounts. However, Section 126 explicitly stated that it was not necessary to specify either the actual amounts of the profits or losses of the subsidiaries or the actual amounts that had been taken into the holding company accounts.

Through the 1930s a series of authoritative pronouncements suggested that the provisions of Section 126 were no longer considered adequate and this developed into influential support for consolidated accounts. In 1932 the Society of Incorporated Accountants and Auditors (SIAA) published a report which called for Section 126 to be extended so that the amounts of the subsidiary companies' profits and losses were to be stated in the holding company accounts. In 1933 this demand was repeated in a report published by the Association of British Chambers of Commerce (ABCC) (Bircher, 1988, p. 110).

In a previously unremarked report the Institute of Chartered Accountants in England and Wales (ICAEW) also supported reform. The minutes of the ICAEW Parliamentary and Law Committee record that at a meeting on 23rd January 1935 a Company Law Amendment sub-committee was appointed to make preparation for the possibility of a company law amendment act being introduced. The members of this sub-committee were Messrs. Howitt (Chairman), Cutforth, McAuliffe, Carter, Cash, Barton and Hill. The minutes of the sub-committee meeting of 4th December 1935

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record that the committee agreed that:

- (a) the provisions of Section 126 should be amended to provide that the directors should either definitely state the holding company's share of the profits less losses of the subsidiary companies or should give reasons why it had not been stated; and
- (b) the directors should be required either to submit a consolidated balance sheet in addition to the balance sheet of the holding company; or to submit with the balance sheet of the holding company the balance sheets of all important subsidiary companies; or to state why in their opinion such a course of action was not desirable or practicable.

The minutes of the sub-committee meeting of 5th April 1938 confirm that these positions had been maintained and indeed strengthened. The suggestions for disclosure were kept substantially the same and the options of not complying but of directors stating their reasons for so doing were mostly removed.

In February 1939 the Committee of the London Stock Exchange issued a statement indicating that, before it would grant permission to its member firms to deal in issues of new shares by any holding company, it would require an undertaking from the company that it would annually circulate consolidated balance sheets and profit and loss accounts to its shareholders.

Formally this requirement only applied to companies issuing new shares. However, *The Economist* (25th February 1939, p. 402) expressed the hope that:

the official recognition of the principle that consolidated accounts are essential for shareholders may provide a precept for [other companies] to follow.

Similarly *The Accountant* (25th February 1939, p. 246) stated that:

all companies coming within the description quoted will be hard put to it to excuse themselves from falling into line and the case for consolidation seems to us to have been won without the trouble and rigidity involved in a statutory provision.

The Stock Exchange was reluctant to insist on a blanket requirement that compliance with such a statement be a condition of continued quotation. When asked whether the Stock Exchange would ever threaten removal of the quotation by reason of unsatisfactory accounts, the Stock Exchange representative giving evidence to the Cohen Committee in 1944 replied (para. 6268) that:

we do not want to be told that we are laying the

law down and arrogating to ourselves rights we do not possess and so on and we have to be rather cautious.

Nevertheless the February 1939 requirement was clearly intended to provide guidance for listed companies generally, and the report of the General Purposes Committee of the Stock Exchange for the year to March 1939 reveals that the statement was only issued after searching investigation and consultation with interested parties to ensure that it would be effective in achieving its primary object—the better protection of the interests of the public.

In February 1944 the ICAEW issued its Recommendation VII. This suggested the circulation with the published accounts of a consolidated balance sheet and a consolidated profit and loss account. In addition it provided guidance on the form and content of these statements. Although non-compliance with the Recommendation carried no explicit sanction, it was intended as a guide to best reporting practice (ICAEW, Introduction to the Recommendations).

The legal requirement in the Companies Act 1948 to provide group accounts, with a presumption that these would ordinarily be consolidated accounts (CA 48, S. 151), was thus a codification of what was already authoritatively considered to be best practice. The view that, in Britain, the principle of consolidated accounting had gained general acceptance by the Second World War is one that is already reflected in the literature. For example, Walker (1978, p. 78) comments that:

by the mid-1930s consolidated reports were not only familiar but also widely accepted.

Similarly Nobes and Parker (1985, p. 218) state that:

Dunlop Ltd led the way during the 1930s and by the end of the decade consolidation had become generally accepted.

Although the principle of consolidated accounting had gained widespread approval it is not clear to what extent this was reflected in the accounting practices adopted by holding companies. Walker (1978, p. 94) maintains that after 1932 there was an increasing use of consolidated accounting techniques stimulated by the Royal Mail case, arguing that:

the Royal Mail case was undoubtedly a turning point.... It prompted a series of changes in accounting practice. In particular it seems that the Royal Mail case was a major factor in encouraging the publication of consolidated statements.

He goes on to assert (p. 334) that, by 1940,

US and UK accountants had firmly adopted consolidated reporting.

Edwards and Webb (1984) chart the development of group accounting in the UK up to 1933, the date of publication of Dunlop's celebrated accounts. Up to that date they found that the rate of adoption of consolidated accounts by UK companies was slow. However, they go on to echo Walker, saying (p. 48) of the Royal Mail case that:

certainly this case, together with the widely acclaimed reporting procedures introduced at the Dunlop Rubber Co. Ltd. for 1933 provided additional stimuli for the adoption of [economic] entity based financial reports.

Edwards (1981, p. 30) in his study of the reporting practices of iron and steel companies refers to a growing tendency to publish consolidated accounting information voluntarily during the 1930s.

In contrast to the views of the above authors, still others have commented that the practice of consolidation did not achieve widespread adoption until later. For example, Kitchen and Parker (1980, p. 109) argue that inertia in the business world was such that general adoption of consolidated statements was delayed into the 1940s. Similarly, Zeff (1971, p. 16) comments that, at the time of publication of the ICAEW Recommendation VII in February 1944, the publication of consolidated statements was not common practice. The Cohen Committee Report (para. 119) observed that:

The issue with the statutory balance sheet of consolidated accounts . . . is becoming more frequent but there is still a considerable number of holding companies which fail to give shareholders the information necessary to enable them to form an adequate view of their interests.

The existing literature thus presents a picture of fairly widespread acceptance of the idea of consolidated accounting by the mid-1930s but much less acceptance of the practice. Indeed, it is not possible to determine from the literature how and when such practices achieved widespread adoption—there being somewhat conflicting views. In an attempt to extend our understanding of the evolution of consolidated accounting in Britain, an examination was made of the reporting practices of a sample of holding companies over the period 1938–1948—the decade preceding the first legislative requirement in the UK for group accounts.

Survey results

The accounting practices adopted were identified from the accounts which listed companies filed with the London Stock Exchange. These are available at the Guildhall Library, London. The

accounts are filed in annual periods running from 1st July to 30th June and they are arranged in Stock Exchange Year Book order.

The periods investigated were the 12 months ending in June 1939, June 1945 and June 1948. The first period includes the February 1939 Stock Exchange ruling. The second period represents the last which the Cohen Committee could examine before their report was published in June 1945. It also represents the first period after ICAEW Recommendation VII. The third period is the last year before companies were legally required to provide group accounts.

The sample investigated was the 40 largest holding companies, by market capitalisation, taken from the commercial section of the Stock Exchange Year Book. The sample was extracted from the rankings given by Hannah (1983, pp. 102/185) of the largest manufacturing companies in 1930. Large companies were sampled because of the increased likelihood that they operated through subsidiaries.¹ In all three periods each such company disclosed an 'investment in subsidiaries' on the face of its balance sheet, as required by Section 125 of the Companies Act 1929. A sample of large companies was also more likely to include those companies that establish best practice. Thus, the identified sample includes many of the companies, such as Dunlop and ICI, that authors have pointed to as models of advanced financial reporting.

Accounting practice 1938/39

Table 1 indicates that the frequency of adoption of consolidated accounting by sample companies in 1938/39 was relatively low. Five companies (Unilever, ICI, Dunlop, Wall Paper Manufacturers and Inveresk Paper) provided both a consolidated profit and loss account and a consolidated balance sheet. A further four companies (Turner & Newall, AEI, Morris Motors and Radiation) provided only a consolidated balance sheet. In all, some 22.5% of the sample had voluntarily adopted some form of consolidated financial reporting. However, the figure of 22.5%, and that of 12.5% for both statements, probably represents the upper limit to the frequency of adoption for the population since the sample was chosen from those companies which appeared most likely to establish and follow best practice. It seems clear therefore that consolidated accounting was not a generally accepted practice by 1939.

Note also that in 1938/39 the information provided by consolidated accounts was not being provided in other ways. Section 126 of the CA 29 exempted companies from stating the amount of subsidiary company results. Most companies in the

¹To find 40 holding companies only the first 41 companies from Hannah's list had to be examined.

sample appear to have availed themselves of this exemption and provided no voluntary information about the amount of subsidiary company profits. None of the 35 companies which did not provide a consolidated profit and loss account reported the amount of subsidiary company results, although two companies (Turner & Newall and the Bleachers Association) did indicate that the holding company accounts reflected all or substantially all of the holding company's share of the subsidiary companies' profits and losses. They did not however disclose the amounts so reflected.

Finally, note that it was not common practice to provide information on the composition of the group. Only seven companies in the sample provided the names of subsidiaries or principal subsidiaries (ICI, GEC, Turner & Newall, AEI, Morris Motors, United Dairies and Inveresk Paper).

Group accounting information was thus seriously deficient by the standards that were regarded as best practice in the literature at this time. In particular, the provision of a consolidated profit and loss account was rare. Indeed, *The Accountant* was to comment as late as 22 July 1944 (p. 38) that:

it is to be regretted that in many cases where consolidation is now practised, publication stops short at the balance sheet and does not include the revenue account.

Accounting practice 1944/45

ICAEW Recommendation VII was published in February 1944. Companies with year ends falling into the 1944/45 period thus had a minimum of four months notice that a consolidated balance sheet and a consolidated profit and loss account 'should' be provided with the annual accounts. However, Table 1 reveals that the overall level of adoption of consolidated accounting practices remained relatively low. Two more companies (United Dairies and British Celanese) now provided both a consolidated balance sheet and a consolidated profit and loss account. Two further companies (Boots and Bradford Dryers) began providing a consolidated balance sheet only. This brought the numbers to seven who provided both statements and six who provided a consolidated balance sheet only. However, more than two thirds of the companies in the sample still provided no consolidated accounting information at all.

Zeff's comment that consolidated accounting was not common practice at the time of Recommendation VII thus appears to be justified but the impact of Recommendation VII on accounting practice is at best ambiguous. It is possible that the apparent failure of companies to adopt Recommendation VII immediately may have been due to the short notice period for companies with year ends falling into 1944/45. The continuing

effects of the war and the shortage of staff may also have been responsible. However, the Recommendations were not mandatory and opinions differ on whether or not they were effective in influencing accounting practice. Leach (1981, p. 4), President of the ICAEW in 1969–70, says that the Recommendations were:

in no way mandatory and not much help to the auditor in persuading his client to accept best accounting practice.

However, Zeff (1971, p. 22) comments that:

while hard evidence is not available, informed observers attest to the effectiveness of the Recommendations in upgrading practice.

The evidence from one period, during which Recommendation VII did not significantly influence accounting practice, is not sufficient to justify any general comment on the influence of the Recommendations. Furthermore, since subsequent practice might also have been influenced by the Report of the Cohen Committee (June 1945), it is not possible to isolate the effect of Recommendation VII *per se*. However, the comment in the Cohen Report (para. 119) that there was still a 'considerable number' of holding companies which failed to provide adequate information on group performance appears to be justified.

Accounting practice 1947/48

The Cohen Committee report recommended the publication of both a consolidated profit and loss account and a consolidated balance sheet. This recommendation was adopted in the Companies Act 1947 (6 August 1947) and subsequently in the consolidating Act of 1948. CA 48 did, however, give directors the option of providing group accounts in another form (S.151). Table 1 reveals that the legal requirement (effective 1 July 1948) to publish group accounts was to a significant extent anticipated by the companies in the sample. Twenty-nine out of the remaining 39 companies (74%) published a consolidated balance sheet, and 25 (64%) published both a consolidated balance sheet and a consolidated profit and loss account. This compares with 32.5% and 17.5% respectively for the 1944/45 period. By July 1948 consolidated accounting had become commonplace.

Influences on the adoption of consolidated accounting

A consensus on the desirability of consolidated accounting developed in Britain in the 1930s. However, as has been seen, this was not to any significant extent matched by the use of consolidated accounting in practice. How can this div-

ergence of accounting practice from what came to be considered best practice be explained?

At the time of the Greene Committee (1926) the failure to provide group accounts was not considered at odds with good reporting practice. It

appears that subsequently the perception of what was considered best reporting practice shifted whilst practice largely remained unaltered. Many authors have pointed to the Royal Mail case (1931) as the principal stimulus to a major revision of

Table 1

The provision of a consolidated balance sheet (CBS) and a consolidated profit and loss account (CPL)

Company	1938/39		1944/45		1947/48	
	CBS	CPL	CBS	CPL	CBS	CPL
1. Unilever	Yes	Yes	Yes	Yes	Yes	Yes
2. Imperial Tobacco	—	—	—	—	Yes	Yes
3. ICI	Yes	Yes	Yes	Yes	Yes	Yes
4. Courtaulds	—	—	—	—	Yes	Yes
5. J & P Coats	—	—	—	—	—	—
6. Dunlop	Yes	Yes	Yes	Yes	Yes	Yes
7. Kemsley Newspapers	—	—	—	—	Yes	Yes
8. Ford	—	—	—	—	—	—
9. GEC	—	—	—	—	Yes	Yes
10. Associated Portland	—	—	—	—	Yes	Yes
11. Reckitt & Colman	—	—	—	—	Yes	Yes
12. Boots Pure Drug	—	—	Yes [1]	—	Yes	Yes
13. Turner & Newall	Yes [2]	—	Yes [2]	—	Yes	Yes
14. J Lyons	—	—	—	—	Yes	Yes
15. Bovril	—	—	—	—	—	—
16. British Cocoa	—	—	—	—	—	—
17. Carreras	—	—	—	—	—	—
18. AEI	Yes [2]	—	Yes [2]	—	Yes	Yes
19. Fine Spinners & Doublers	—	—	—	—	—	—
20. Tate & Lyle	—	—	—	—	—	—
21. Daily Mirror	—	—	—	—	—	—
22. J. Sears	—	—	—	—	Yes	Yes
23. British Match	—	—	—	—	Yes	Yes
24. Wall Paper Manufacturers	Yes	Yes	Yes	Yes	Yes	Yes
25. Morris Motors	Yes	—	Yes	—	Yes	—
26. British Insulated Cables	—	—	—	—	Yes [3]	Yes
27. United Dairies	—	—	Yes [1]	Yes	Yes	Yes
28. Liebig's	—	—	—	—	Yes	Yes
29. Bleachers Association	—	—	—	—	Yes	Yes
30. British Celanese	—	—	Yes	Yes	Yes	Yes
31. Pinchin Johnson	—	—	—	—	—	—
32. Combined Egyptian Mills	—	—	—	—	—	—
33. Winterbottom Book Cloth	—	—	—	—	Yes	—
34. Inveresk Paper	Yes	Yes	Yes	Yes	Yes	Yes
35. British Aluminium	—	—	—	—	Yes	Yes
36. Bradford Dyers	—	—	Yes	—	Yes	—
37. Radiation	Yes	—	Yes	—	Yes	—
38. Callenders Cable	—	—	—	—	— [3] —	—
39. English Sewing Cotton	—	—	—	—	Yes	Yes
40. Linen Thread	—	—	—	—	Yes	Yes

Notes

1. The consolidated accounts are sub-consolidations (or aggregations) of the accounts of the subsidiaries.

2. Only those subsidiaries in which the holding company holds a 75% interest have been consolidated.

3. British Insulated Cables and Callenders Cables merged.

what was considered best reporting practice (see Walker, 1978; and Edwards & Webb, 1984 above). De Paula (1948, p. 265) for example comments that:

The development of the movement towards the improvement in the form of presentation of accounts and the establishment of an agreed code of basic accounting principles can be traced back some twenty years or more. . . . The [Royal Mail] case in 1930 [sic] fell like an atomic bomb and profoundly disturbed both the industrial and the accounting worlds. It was this event, in the writer's judgement, that gave this whole movement its first great impulse.

It is suggested that the reason the Royal Mail case had such an impact on contemporary accounting thought was that the case questioned some of the fundamental assumptions which underpinned both professional opinion and the provisions of the law relating to corporate accounting. In particular the case questioned the assumption that accounting was essentially a matter of private concern between the shareholders and their directors which could safely be left for internal resolution.

With respect to secret reserves, Mr Justice Wright stated (ICA 1933, p. 501) that:

It is said to be a matter of domestic concern between the company and the shareholders, but if shareholders do not know and cannot know what the position is, how can they form any view about it at all.

The idea that the form and content of accounts was a matter of domestic concern was one which had a long pedigree. Gower (1969, p. 117) refers to the influential judge Lindley L.J., saying:

Lindley of course always regarded company law as a branch of the law of partnership and was therefore the more likely to leave matters in the hands of the proprietors and their advisers.

The evidence of the ICAEW to the Greene Committee, which significantly influenced the Committee's conclusions (Edwards, 1979, p. 281; 1981, p. 6), also rested on this assumption of shareholder control of the dissemination of accounting information. The ICAEW representative to the Greene Committee hearings stated (Greene Committee Evidence, paras. 4398/9) that if shareholders were not satisfied with the information they were given by directors they could always ask for further information and if it was not forthcoming they could turn out the directors or not re-elect them.

The understanding of the role of the shareholder contained within this perception is one of active involvement. It is rooted in the idea of a tightly controlled company where there is an active link

between the owners and their directors. Within this perception, if information is not included in the accounts it is because shareholders have acquiesced in its omission. Enforced disclosure only benefits outsiders, including competitors.

This idea of shareholder control co-existed in a rather uneasy fashion with a strong attitude of paternalism often held by directors towards shareholders which portrayed them as uninformed and foolish. The chairman of Tube Investments, for example, stated (Baxter, 1950, p. 205) in 1935 that it was a good idea to restrict reported profits to the intended dividend payment as:

it is better not to show more and run the risk of exciting appetites that you are not going to satisfy.

Shareholders, in other words, were not to be privy to the actual results in case they became excited and demanded too high a dividend. This was a widely used argument about the consequences of financial reporting and one which the Cohen Committee had explicitly to confront, saying (para. 101) that:

we do not believe that if fully informed shareholders would press for excessive dividends and we are in favour of as much disclosure as practicable.

The paternal attitude towards shareholders may be seen as part of a managerial ideology, a legitimating argument buttressing the controlling position which directors in fact had come to occupy over their shareholders. The attitude of paternalism was one which the judge in the Royal Mail case strongly attacked (de Paula, 1948, p. 36):

It is a little astounding, and one cannot help wondering whether those who manage big companies do not forget sometimes that the body of directors of a company are the agents and the trustees of the shareholders, that they owe full information subject to proper and reasonable commercial necessity; they owe them full information and it is their interests that they have to study; they are not to regard shareholders as people who may look up if they are not fed; they are the people whose money they are using.

Yet despite the widespread existence of a paternal, often dismissive attitude towards shareholders, the principle of shareholder control of corporate accounting was still formally adhered to as a fundamental element of contemporary accounting thought. D'Arcy Cooper, chairman of Lever Bros, was the only chairman of a large industrial group to give evidence to the Greene Committee, and Kitchen (1979, p. 105) reports that the Committee were to be closely guided by his opinion about the accounts of holding companies. His memorandum of evidence to the Greene Committee explicitly

supports the principle of shareholder control as the foundation upon which the law relating to accounting should be based:

I do not think that the Law as it exists today requires any amendment in relation to the publication to shareholders of accounts of a holding company or its subsidiary companies. It seems to me that the owners of a business should themselves be the judges of what information relating to that business should be made public to the world. The matter is one, I submit, between the shareholders and the directors of the company and should be left to be regulated by the Articles of Association of each Company upon the faith of which the share capital of the company has been subscribed.

The Greene Committee chose largely to uphold the principle of shareholder control. With regard to consolidated accounts they said (para. 71) that:

the matter should be left to the shareholders to make such requirements as to the form of their company's accounts as they may think proper. It is often forgotten that it may be in the best interests of the shareholders themselves that the accounts should be in a certain form, and we consider that undue interference by the legislature in the internal affairs of companies is to be avoided, even if some risk of hardship in individual cases is involved.

The provisions of CA 29 reflected this position.

Yet if the model of the corporation inherent in such a position had once been representative of the corporate economy, by the time of the Greene Committee the divorce of ownership and control in public corporations made it an unrealistic representation of the way in which corporate accounting was controlled.

Even members of the Greene Committee recognised this. The chairman, in questioning the ICAEW representative about whether shareholders could in fact demand information of the directors observed (Greene Committee Evidence, para 4399) that:

many of us know they try to get [information] but do not get to know.

Such an observation is consistent with the cases reported by Edwards (1979, p. 283) where shareholders of both the Rio de Janeiro Flour Mills and Granaries Co. and the RMSP Co. specifically asked the chairmen for information but were rebuffed.

It is in fact doubtful whether the model of shareholder control of the dissemination of accounting information had ever been very appropriate. Yamey (1977, p. 28) states that:

there can be no doubt that in the nineteenth

century the wide area of discretion in accounting to shareholders was often exploited by hard pressed or unscrupulous managements.

By the 1930s the growth of the large public corporations and the increasing length of shareholder registers meant that shareholder control was becoming ever more unrealistic. Hannah (1983, p. 27) remarks that in the United Kingdom the First World War marked a watershed in economic and business development. He comments (p. 123) that, in the dozen years following the War, the unprecedented merger waves and the vigorous internal growth of companies meant that, by the early 1930s, many of the features that distinguish the modern corporate economy from the Victorian economy of small firms were firmly established. In particular he comments (p. 57) that:

it is the divorce of ownership and control... that has characterised the twentieth century development of capitalist enterprise.

This trend was also documented by Pollard (1969, p. 163) who commented that:

In one industry after another the family firm gave way to the registered company with its numerous and anonymous shareholders and its elected Board of Directors. By the end of the 1930's one of the consequences of this development, the divorce of ownership from control had become very marked.

Pollard records (p. 163) that this development was noted by Keynes as early as 1924 when he referred to the tendency of joint stock institutions to approximate to the status of public corporations rather than to individualistic private enterprise, at which point the shareholders became almost entirely divorced from the management.

Sargant Florence (1947, p. 17) referred to Berle and Means' conclusion that, in the largest 200 American non-financial corporations, the divorce of management from ownership was practically complete. He attempted to identify the extent of the divorce in Britain in 1936 and concluded that there was usually a more or less complete divorce of ownership from control. It was these developments which led Burnham (1942, p. 68) to talk of a managerial revolution, a transition from a capitalist society to a managerial society.

It is suggested that it was the ever increasing divergence between the reality of the large diversified public corporation and the model of the company which had influenced legislators that provided the coiled spring of contradiction which was to give the Royal Mail case its traumatic impact and which was to lead eventually to a new perspective on accounting. The Greene Committee proposals did not respond to the changing nature of the corporate economy. By the time of the setting up of

the Cohen Committee, however, the divorce of ownership and control had been recognised by the Board of Trade and with it the need to protect the interests of the disenfranchised and vulnerable shareholder. The memorandum which led to the setting up of the Cohen Committee stated that:

It may be doubted whether existing company law sufficiently recognises modern social trends in investments. The small investor whose numbers are now legion is virtually a sleeping partner with neither the wish nor the opportunity to undertake any of the management responsibilities which underlie the present legal conception of the shareholder and he therefore needs special protection.

This shift in understanding of the nature of the shareholder is one of the principal factors in explaining the difference between the accounting provisions of CA 29 and CA 48 and it mirrors the changes that had taken place in the nature of the corporate economy. Professor Goodhart (Professor of Jurisprudence at Oxford and Cohen Committee member) referred to the question of shareholders' control as 'really the most important point in company law' (para. 9479, Cohen Committee Evidence). In questioning Mr Crowther, Editor of *The Economist*, he remarked: 'In theory shareholders have complete control through electing the directors. Do you think that this is true in practice?' Crowther replied: 'No Sir, I think there is a considerable divergence between the legal theory and the actual practice in the great majority of cases'.

The Royal Mail case was so important because it drew attention to the anomalies that had developed between the assumptions about the corporation which underpinned both professional opinion and the attitude of the law to accounting and the reality of the modern corporation. In the wake of the Royal Mail case perceptions about what was considered to be best reporting practice, and how that practice should be governed, began to change, and the reports of the SIAA, ABCC and ICAEW (see above) were forthcoming.

The financial reporting of holding companies was seen as possibly the most important aspect of accounting in need of reform. For example, Bircher (1988, p. 113) notes the urgent pressure for reform on the subject brought to bear upon Board of Trade officers by Henry Morgan (an ex-president of the SIAA). Also, the minutes of the committee set up by the ICAEW to consider company law reform record that, at their meeting of 7th May 1935, the Committee decided that the subjects with which they had to deal were, in order of importance:

- Subsidiary Companies
- Secret Reserves

- Profit and Loss Account
- Balance Sheet

Yet although the Royal Mail case had stimulated accounting debate and apparently led to a fundamental shift in opinion about what was to be considered best reporting practice and its governance, very little happened that would necessarily lead a reporting company to alter its accounting practices. The defendants in the Royal Mail case were in fact acquitted, at least on the financial accounting charges. No new initiatives on company law were forthcoming and certainly nothing happened to disturb the divorce of ownership and control which had placed the choice of accounting practice into managerial hands. Accordingly, except for those companies sensitive to public opinion, there was no reason to expect companies to alter their accounting practices. The reasons which had led companies in the past to provide only restricted information about group position and performance presumably, in the absence of significant sanctions, continued. This conclusion is consistent with the absence of any very significant rate of adoption of consolidated accounting practices by companies in the sample even as late as 1945.

It is not clear, however, just what reasons prompted directors to provide only limited group accounting information. Edwards and Webb (1984, p. 4) quote Garnsey who, in 1931, referred to the growing demand for consolidated statements but observed that:

perhaps the real opposition to any but the most essential changes in the form of published accounts often comes from boards of directors who are not at all imbued with the desire to give their shareholders as much information as possible.

Edwards and Webb attribute opposition to consolidated accounting to management's desire to smooth reported (holding company) profits as a means of fostering financial stability. This facility would be lost were consolidated accounts to be provided because any pool of reserves built up at subsidiary level would be revealed and therefore unavailable for undisclosed holding company results manipulation. This is precisely the point made by *The Accountant* (22 July 1944, p. 38) when, lamenting the failure of companies to provide consolidated profit and loss accounts, they commented that if companies were to provide such statements:

an obvious and very desirable result would be that the inner reserves which now exist in the form of subsidiary profits not transferred would be brought to light or, on the other hand, the amount of subsidiary losses not taken up would be disclosed.

Kitchen and Parker (1980, p. 109) suggest that it was just inertia which prevented the widespread adoption of consolidated statements. However, it was noted above that no companies disclosed the amount of their subsidiary company profits if they did not provide a consolidated profit and loss account. This information had been the subject of earlier demands for reform by the SIAA, the ABCC and the ICAEW. Its provision would have involved very little expense and would have gone a long way toward satisfying the information provided by a consolidated profit and loss account. The refusal of companies to disseminate even this information suggests that the failure to provide group accounting information was not inertia but resistance. Nor can the War be easily used to explain the absence of change since some companies, despite war conditions, were able to adopt new forms of accounting (United Dairies, British Celanese, Boots and Bradford Dyers). Similarly the ICAEW was able to establish its Taxation and Financial Relations Committee and start the Recommendations series. The issue of accounting policy was not put on ice for the duration of the war.

British experience of group accounting in the 1930s and 1940s thus provides an unusual example of a prolonged divergence between ideas of what constituted best reporting practice and the actual reporting practices adopted by companies. The whole concept of best practice when applied to this relatively unregulated era is a little uncertain, but there had long existed authoritative calls for information substantially in excess of that required by S.126 of CA 29 and these calls were largely ignored. To the extent that these demands for further information by the SIAA, the ABCC, the ICAEW and the Stock Exchange were representative of shareholder opinion, then it can be said that, over the period studied, directors of large companies did not usually provide the information that shareholders were assumed to require.

This situation only changed after 1945. The Cohen Report signalled the intention of the government to intervene more comprehensively in the process of corporate accounting, and the Report was acted upon in the CA 47. Most of the third period studied, 1947/48, lies after the enactment of CA 47 (6 August 1947) and thus probably reflects an awareness by companies of impending legislation to enforce group accounts.

State intervention in the accounting process on a much more comprehensive basis than ever before was in part a consequence, as has been noted above, of the recognition within the Board of Trade that corporate structure and internal relationships had changed. A perception had developed that the shareholder needed protection. Additionally, as Bircher (1988, p. 117) notes, the change in social attitudes engendered by the war

increased the propensity for state action on matters of public interest, and the formation and affairs of companies had been identified as just such a matter.

The Economist had made that very point many years earlier (June 12 1926, p. 1133) arguing that, with the growth in size and power of great joint stock corporations, their published accounts had become matters of public interest and that any revision of the company law should be approached not merely from the point of view of the company itself but from that of what the public ought to know.

The Economist again argued the case for the need to recognise the public significance of corporate accounting in 1942 (17 October 1942, p. 235) when it stated that:

For private enterprise to continue to deliver the goods capital must flow into those industries where the return is high and be withdrawn from those where it is low. The publication of frank, full and proper accounts is needed in order to disclose the position. . . . It is beyond question that such knowledge would lead to the use of savings in a manner beneficial to the community.

This clearly expressed a link between accounting appraisal, capital flow and national benefit, and a letter to *The Accountant* from F.R.M. de Paula² (31 October 1942, p. 268) reported that the opinions expressed in the article were not confined to *The Economist* but had attracted the approval of other financial organs.

Ideas of the public significance of company accounts surface in the Cohen Report. They comment (para. 101) that:

It is also important in our opinion to ensure that there should be adequate disclosure and publication of the results of companies so as to create confidence in the financial management of industry and to dissipate any suggestion that hidden profits are being accumulated by industrial concerns to the detriment of consumers and those who work for industry.

Similarly (para. 5):

We consider that the fullest practicable disclosure of information concerning the activities of companies will lessen [opportunities for abuse] and accord with a wakening social consciousness.

The Economist (3 June 1944, p. 756) bluntly stated that:

Until published accounts approach much nearer

²Vice Chairman of the Taxation and Financial Relations Committee of the ICAEW which was responsible for the Recommendation series.

to giving a true and clear picture it is useless to hope that the best will be made of [the] existing economic system.

It is possible that increased sensitivity to the social obligations of corporations which the war produced was responsible for the desire of company managements in 1947/48 to present a 'true and clear' picture of their activities by publishing consolidated accounts.

However, in view of managements' previous intransigence, such an explanation would appear to be implausible and a more likely explanation of the rise in the rate of adoption of consolidated accounting in 1947/48 appears to lie in the impending legislation to enforce group accounting. It is possible that many corporations recognising the forthcoming need to alter their accounting practices took what advantage they could from the change by anticipating the legislation, so being seen as examples of open and advanced accountability. In the face of a *fait accompli*, particularly one supported by public opinion, this would seem to be a sensible policy.

It is worth noting however that there were several other factors in the immediate post-war period, besides the impending Companies Act, that may also have led companies to adopt consolidated accounting when they had not previously done so.

First, Thomas (1978, p. 155) notes that in 1947 there was a 55% jump in the value of debt as a percentage of the value of company securities issued (from 15.6% in 1946 to 24.1% in 1947). Whittred (1986) establishes a connection in Australia between a shift in the significance of debentures/new notes (from representing 30% of new money raised in 1955 to 80% in 1960) and the evolution of the widespread publication of consolidated accounts. It is possible that the rise in the rate of adoption of consolidated accounting in Britain in 1947/48 owed something to the demands of lenders for more comprehensive accounting information than had been previous practice, particularly since these years were a period of capital scarcity which would have substantially increased lenders' bargaining power.

Second, from the 1st January 1946 the rate of excess profits tax (EPT) was cut from 100% to 60%. Since May 1940 companies had been subject to EPT levied at a rate of 100% on all profits above a standard return on capital employed, fixed by reference to pre-war experience and subject to a minimum of 6% (Sayers, 1956, p. 119). Profitability was therefore constrained to the allowed standard and, so long as the company was making a return of at least 6%, all fluctuations were taxed away. Whittred (1987) has pointed to the many differential incentives that the imposition and removal of such taxes can have. It is possible that,

in the case of the EPT, one effect of its removal was to stimulate the publication of consolidated accounts. For six years reported profits had been constrained to the allowed return. With the cut in EPT to 60%, however, investors were once again faced with a variability in post-tax profits and companies may once again have started to consider the adequacy of their accounting policies in reporting to shareholders. The removal of the EPT may thus have created an incentive to adopt new accounting practices including consolidated accounts.

Third, the chancellor, Dr. Dalton, requested in his August 1945 budget that companies should devote funds to post-war development rather than to the payment of dividends. Although no statutory compulsion was forced upon companies to comply with this request (until later), Thomas (1978 p. 238) records that there was wide acceptance of 'moral' dividend limitation in the immediate post-war years of 1946/47, although there were still some increases in dividend payments.

The limitation of dividend payments could create incentives for the publication of consolidated statements. Retention of funds for post-war development by subsidiaries would compound the problem of undisclosed inner reserves being built up in profitable subsidiaries if group accounts were not provided. To the extent that holding company accounts reflected a reduced dividend income from subsidiaries and reported profits were reduced, it is possible that an incentive to publish consolidated accounts was created.

The rise in the rate of adoption of consolidated accounting in 1947/48 thus has to be seen in the context of impending legislation to enforce group accounting, changing perceptions of the social obligations associated with corporate accounting and several specific developments in the corporate environment that may have directly stimulated accounting change. It is not possible to separate out the relative impact of each of these factors, although the significance of the impending legislation cannot easily be overlooked.

Conclusions

Consolidated accounting only achieved widespread adoption in Britain after the Second World War in the shadow of legislation to enforce more comprehensive dissemination of group accounting information by holding companies. For at least the previous decade there had been a substantial gap between the reporting practices adopted by holding companies and what was authoritatively regarded as best practice. This divergence arose from changes in the perceptions of accounting and its significance through the 1930s, unmatched by a change in the accounting practices adopted by effectively autonomous corporate managements.

The legislation which introduced consolidated accounting was premised on the newly perceived need to protect disenfranchised shareholders and codified what had come to be seen as the best practice in reporting to them. The same premise underlay the regulatory endeavours of the Stock Exchange and the ICAEW.

The actual widespread adoption of consolidated accounting in Great Britain appears to have emerged from a complex set of influences at the end of the War. One major element of that complex, however, was the impending state regulation of group accounting and also the existing institutional regulatory endeavours. To the extent that these affected the adoption of consolidated accounting in the UK, the development of the practices owes much to the substantial change in the perception of the nature of the shareholder which developed in the 1930s. This change itself stemmed, with a lag, from changes in the nature of the corporate economy in the UK in the inter-war period.

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Financial Accountability & Management

Winter 1988

Editor: John Perrin

Vol. 4 No. 4

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Modelling Accounting Populations for Ratio Estimation in Audit Sampling

Hung Chan*

Abstract—The classical ratio estimator is one of the auxiliary information estimators frequently discussed in the audit sampling literature. The major weakness of this estimator is its unreliability when accounting populations have only one-sided errors or when the error rate is low. Efforts have been made to improve the classical estimator by using techniques such as the Jackknifed ratio discussed by Frost and Tamura (1982). This paper proposes a new method to estimate the population total error based on the ratio of error over book value, i.e., taintings.

The special features of the proposed procedure are that (1) it specifically models the special characteristics of the typical accounting populations, and (2) it is the first study we know of in the audit sampling literature that uses simulation to capture the characteristics of the specific distribution of the estimator each time a confidence interval is constructed. This new approach became possible because of the recent publication of several studies on the empirical characteristics of accounting errors. Results of empirical tests indicate that the proposed method can significantly improve the reliability of the classical ratio under circumstances where the classical ratio needs improvements. Empirical comparisons are also made with a third ratio estimator under dollar-unit sampling. Again, the proposed method provides better reliability.

Introduction

One important research topic in audit sampling has been the development of new and improved methods to determine the confidence bounds for the population total error. An inappropriate method, for example, may provide a confidence level that is substantially below the assumed level. Consequently, continuing research is needed to develop better audit techniques in this area, and to provide useful information to guide auditors to choose an appropriate audit evaluation method.

Kaplan (1973b) was one of the first to indicate that inferences about accounting populations are best made using auxiliary information estimators. According to his experiments, the classical ratio estimator seems to work as well as any other auxiliary information estimator. The primary deficiency of the ratio estimator is the unreliability of the confidence interval when the population has either low error rates or one-sided errors (Frost and Tamura, 1982, p. 103; Neter and Leobbecke, 1975, Ch. 4). Efforts have been made to improve the performance of the ratio estimator. These include the use of a Jackknifed ratio suggested by Frost and Tamura (1982) and a modified ratio based on dollar-unit sampling proposed by Garstka and Ohlson (1979).

Recently, there has been an increase in the availability of empirical evidence on the character-

istics of accounting errors (see, for example, Johnson, Leitch and Neter, 1981; Ham, Losell and Smieliauskas, 1985; and Kreutzfeldt and Wallace, 1986). One possible way to improve the performance of ratio estimation in audit sampling is to use a method which explicitly takes advantage of knowledge of error patterns frequently encountered in accounting populations. The objective of this paper is to develop and test such a method.

Characteristics of accounting populations

A number of authors have reported and analysed empirical evidence on the error characteristics of accounting populations. Major contributions have been made by Neter and Loebbecke (1975), Ramage, Krieger and Spero (1979), Johnson, Leitch and Neter (1981), Hylas and Ashton (1982), Ham, Losell and Smieliauskas (1985) and Kreutzfeldt and Wallace (1986). While there are differences in their findings, most studies appear to suggest that accounting populations do possess a number of common features. Some of these common features that are relevant to this study include the following.

- (1) The error rate (the proportion of accounts that are in error) varies significantly among accounting populations. For example, the actual error rate in the Neter and Loebbecke populations varies from 6% to 71%. About 60% of the populations studied by Ramage *et al.* (1979) had an error rate less than 5%. Ham *et al.* (1985) reported that 56% of the inventory audits and 31% of accounts receivable audits have an error rate of 5% or less.

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Table 1
Error Tainting Distributions of Neter-Loebbecke Population 4

Interval No.	Error rate Range of Tainting t	0.5%	1%	5%	10%	30%
		Frequency	Frequency	Frequency	Frequency	Frequency
1	$t = 0$	4,013	3,993	3,831	3,630	2,824
2	$0.0 < t \leq 0.1$	4	8	66	121	402
3	$0.1 < t \leq 0.2$	1	4	15	36	90
4	$0.2 < t \leq 0.3$	0	0	0	0	0
5	$0.3 < t \leq 0.4$	0	0	0	0	0
6	$0.4 < t \leq 0.5$	0	0	0	0	0
7	$0.5 < t \leq 0.6$	0	0	0	0	0
8	$0.6 < t \leq 0.7$	0	0	0	0	0
9	$0.7 < t \leq 0.8$	0	0	0	0	0
10	$0.8 < t \leq 0.9$	0	0	0	0	0
11	$0.9 < t < 1.0$	0	0	0	0	0
12	$t = 1.0$	15	28	121	246	717

Note: Frequency refers to the number of accounts in the population with the respective tainting values.

- (2) Populations may have overstatement errors only, understatement errors only, or both, with overstatement errors being more frequent, particularly for accounts receivable (Ham *et al.*, 1985; Kreutzfeldt and Wallace, 1986).
- (3) The error rate does not appear to be correlated with taintings (error as a percentage of book value of each account), although there is inconsistent evidence that it may be correlated with book values (Ramage *et al.*, 1979, esp. pp. 77-78; Johnson *et al.*, 1981). Also, there is usually a high correlation between book and audit values.
- (4) The distributions of taintings are characterised by pronounced discontinuities at $+100\%$, particularly so for accounts receivable for which 100% overstatement errors are frequently present (Johnson *et al.*, 1981; Neter and Loebbecke, 1975, Ch. 2).

The above observations suggested that the probability distribution of accounting errors may consist of at least two distinct parts. The first part is a large mass concentrated at the point zero due to the fact that a significant portion of the accounts has zero error. The second part is the distribution of errors for those accounts that have an error greater than zero. This phenomenon is consistent with Kaplan's comment that 'an auditing population is actually a mixture of two quite different populations; one consists of a large number of correct items; the other is the much smaller population of items in error. Techniques . . . which do not explicitly recognize these fundamentally different populations seem inadequate for auditing applications' (Kaplan, 1973b, p. 257). In fact, one may further refine Kaplan's observation by identi-

fying a third distinct component of the error distribution, namely the 100% errors (or 100% taintings in item no. 4 above). Table 1 shows the tainting distributions of Neter and Loebbecke's Population 4. Based on the above discussion, these appear to be typical tainting distributions with overstatement errors. The method proposed in this paper explicitly takes into consideration the special characteristics of such tainting distributions, utilising a ratio estimation procedure.

Modelling accounting error population

No commonly known probability density function can be used to model well the tainting distributions such as those given in Table 1. The proposed method explained below intends to capture the special characteristics of these tainting distributions in order to generate a ratio estimate of the population total error.

Let:

n = sample size

k_1 = number of accounts with taintings other than zero or $+100\%$

k_2 = number of accounts with $+100\%$ tainting

$e_i, i = 1, \dots, n$, be the error of the i th account in the sample

$b_i, i = 1, \dots, n$, be the book value of the i th account in the sample

$t_i = e_i/b_i, i = 1, \dots, n$, be the tainting of the i th account in the sample,

and

B = the population total book value (a given constant).

Based on the assumptions of the Kaplan (1973a)

model of accounting populations which are generally consistent with the results of the empirical studies mentioned above, the minimum variance linear unbiased point estimator of the population total error with simple random sampling is (see Cochran, 1963, pp. 166–167) and Kaplan, 1973b, p. 242):

$$\begin{aligned}\hat{E} &= \frac{\sum_{i=1}^n \left(\frac{e_i}{b_i} \right)}{n} \cdot B \\ &= \left[\frac{\sum_{i \in k1} \left(\frac{e_i}{b_i} \right)}{n} + \frac{\sum_{i \in k2} \left(\frac{e_i}{b_i} \right)}{n} \right] \cdot B \\ &= \left[\frac{k1}{n} \cdot \frac{\sum_{i \in k1} e_i}{k1} + \frac{k2}{n} \cdot 1 \right] \cdot B \\ &= \left[\frac{k1}{n} \cdot \bar{T} + \frac{k2}{n} \right] \cdot B,\end{aligned}\quad (1)$$

where

$$\bar{T} = \left[\sum_{i \in k1} (e_i/b_i) \right] / k1 = \left(\sum_{i \in k1} t_i \right) / k1 \quad (2)$$

Equation (1) estimates the total error based on the ratio e_i/b_i . However, in order to construct confidence intervals about E , one needs to determine the probability distribution of \hat{E} . As explained below, this does not appear to be a simple matter.

In drawing an account from a population for audit, the account will either have zero tainting, +100% tainting or some other tainting.¹ Since an account can only fall into one of these three categories, the number of accounts in each category follows a trinomial distribution. That is, $k1$ and $k2$ in equation (1) are random variables with a joint probability density function in the form of

a trinomial distribution. As will be explained in the simulation procedure, the average tainting \bar{T} is approximately normally distributed when $k1$ is large, according to the Central Limit Theorem.² Since \bar{T} excludes the extreme values of t_i (see Table 1), i.e., all the t_i 's that equal zero or one, this makes it easier to invoke the Central Limit Theorem for \bar{T} . Therefore, the distribution of \hat{E} involves a mixture of trinomial and normal distributions. Analytically deriving the probability density function of \hat{E} and integrating the function to determine confidence intervals does not appear to be tractable. Therefore, we rely on computer simulations to determine the confidence intervals for E . Simulation is also a much more efficient approach than the analytical method in this particular situation where the variable of interest is a non-linear function of other random variables.³

The proposed procedure for simulating confidence intervals for E is as follows:

- (1) Select a simple random sample of n accounts from the population of N accounts and compute sample statistics $k1/n$, $k2/n$, mean tainting

$$\bar{T} = \left(\sum_{i \in k1} e_i/b_i \right) / k1,$$

and variance of mean taintings

$$S_{\bar{T}}^2 = \sum_{i \in k1} (e_i/b_i - \bar{T})^2 / [k1 \cdot (k1 - 1)].$$

- (2) Draw a pair of random numbers (x, y) from a trinomial distribution with parameters $p1 = k1/n$, $p2 = k2/n$ and $p3 = 1 - p1 - p2$.
- (3) Draw a random number r from a normal distribution with parameters $\mu = \bar{T}$, $\sigma^2 = S_{\bar{T}}^2$.
- (4) Substituting x for $k1$, y for $k2$ and r for \bar{T} in equation (1), compute \hat{E} using equation (1).
- (5) Repeat steps (2), (3) and (4) say 500 times to obtain 500 estimates of the population error.⁴

¹For ease of understanding and because overstatement errors are prevalent in many accounting populations, the discussion here assumes that the population has only overstatement errors. However, the basic rationale of the proposed method applies to populations with both overstatement and understatement errors (i.e. e_i can be either positive or negative). Also, the proposed method does not rule out the possibility of having taintings greater than +100%, even though such a situation is rare. Conceptually, \bar{T} in equation (2) can include any finite taintings other than zero or +100%. However, we implicitly assume that any account with a zero or negative book value (e.g. credit balance in accounts receivable) will be isolated from the statistical inference procedure and be audited separately, since these accounts often indicate peculiar problems (Leslie, Teitlebaum and Anderson, 1979, pp. 129–130 and Ch 9). The elimination of these accounts from the population means that there will be no infinite ratio (tainting) and the tainting distribution will be truncated at +100%. This, for example, is the case for the Neter and Loebbecke data which do not contain any account with zero or negative book values (1975, p. 12).

²The empirical distributions of \bar{T} were studied using part of the Neter and Loebbecke (1975) data base. It was found that the larger the sample size and the higher the error rate (which implies a large $k1$), the closer is \bar{T} to normality. The practical issue is, of course, the extent the proposed method based on the normality assumption can work well when the actual distribution is only approximately normal. This issue is being dealt with in the empirical tests discussed later in this paper.

³Aside from some special cases (e.g. the product of two lognormal variables is a lognormal variable), non-linear functions of random variables generally present awkward analytical problems. Even if the probability density function of the resulting variable can be derived, integrating the density function, which may involve several parameters to determine probability intervals would likely require the use of numerical approximations that can be costly and inaccurate. See for example Hayya and Ferrara (1972).

⁴Most simulation studies on audit sampling use about 500 replications as they normally provide stable results. See, for example, Duke, Neter and Leitch (1982, p. 51) and Menzefricke and Smieliauskas (1987, p. 244).

- (6) Sort and list the 500 estimates in ascending order of magnitude. Determine the confidence intervals from the list. For example, to obtain a 90% one-sided upper confidence interval for E , the estimate ranked 450 will be the upper bound.

Since the above procedure involves modelling the tainting distribution based on ratio estimation using simulation, we refer to this method as model simulation and the resulting estimate will be denoted as simulation ratio or SR. The special feature of this approach is that it explicitly considers the characteristics of the accounting variables involved in the audit inference and it chooses parameters based on the actual sample of errors and book values. Therefore, simulation modelling should be more able to capture the dynamic behaviour of accounting errors than other methods of ratio estimation.

An empirical comparison of alternative ratio estimation methods

This section presents results of an empirical comparison of the model simulation method with two other major ratio estimation methods in audit sampling. The two contrasting methods are:

- (1) Classical ratio (CR) as discussed by Neter and Loebbecke (1975, Ch. 4) based on simple random sampling. Let

$$\hat{E} = \frac{\bar{e}}{\bar{b}} \cdot B \quad (3)$$

where \bar{e} and \bar{b} are respectively the sample mean error and sample mean book value and B is the population total book value. Also let

$$S^2(\hat{E}) = N^2 \cdot \frac{1}{n(n-1)} \cdot \left[\sum_{i=1}^n (e_i - \bar{e})^2 + \frac{\bar{e}^2}{\bar{b}^2} \sum_{i=1}^n (b_i - \bar{b})^2 - 2 \cdot \frac{\bar{e}}{\bar{b}} \sum_{i=1}^n (e_i - \bar{e})(b_i - \bar{b}) \right] \quad (4)$$

Upper error bounds for E are constructed using the standard normal variate z :

$$\hat{E} + z_\alpha \cdot S(\hat{E}) \quad (5)$$

- (2) Modified ratio (MR) based on dollar-unit sampling as presented by Garstka and Ohlson (1979).

The MR bound is computed as follows:

Let tainting $t_i = e_i/b_i$, \bar{D} be the sample mean tainting and S_D be the sample standard deviation of taintings, the one-sided upper bound is computed as:

$$(\bar{D} + C_{n,m,\alpha} \cdot S_D) \cdot B, \quad (6)$$

where

$$C = [(n \cdot P_{m,\alpha}/m) - 1] \cdot [n \cdot m/(n - m)]^{1/2} \quad (7)$$

and where m is the number of non-zero errors in the sample of n accounts, and $P_{m,\alpha}$ is the binomial probability representing the upper $(1 - \alpha)$ confidence limit of the population proportion of errors.

The main objective of this empirical comparison is to see if model simulation can improve upon the performance of the classical ratio estimator in situations where the classical estimator needs improvements. As mentioned earlier, the classical ratio estimator is known to be unreliable when the accounting population has only one-sided errors or when the error rate is low. Frost and Tamura (1982, esp. pp. 103, 118-119) found that the Jackknifed ratio was not able to overcome the unreliability problem of the classical ratio in these circumstances. A secondary objective of this study is to see how a ratio estimator based on a dollar-unit sampling procedure may compare with model simulation.

This comparative study was conducted based on samples drawn from the Neter and Loebbecke (NL) (1975) Populations 3 and 4. The NL populations are well known in the audit sampling literature and have been widely used for comparing the performance of alternative techniques (for examples, see Frost and Tamura, 1982, and Smieliauskas 1986). Populations 3 and 4 were selected because they are the two populations that have only one-sided errors.⁵ The two populations contain a total of ten study populations with error rates ranging from the very low 0.5% to 30%. Population 3 consists of 7026 accounts receivable of a medium-sized manufacturer, whereas population 4 is a set of 4033 accounts receivable of a large manufacturer.

Sample sizes used in this study are 30, 40, 50, 60, 100 and 200 with confidence levels set at 0.99, 0.95 and 0.90. For each sample size and study population, 500 samples were drawn.⁶ The simulation ratio and the classical ratio were based on simple random sampling and the modified ratio was based on dollar-unit samples. Five hundred $1 - \alpha$ one-sided upper error bounds for each of the three methods were then constructed based on the procedures outlined earlier. From the 500 bounds, the precision defined here as the average size of the 500 bounds as a percentage of the respective population book value was computed. Each of the 500 bounds was also examined to see if it included the known population total error. The reliability, i.e. the proportion of the 500 bounds actually containing the respective population total error, was computed for each method at a given α . The results for 95% and 90% confidence levels are presented in

⁵NL Populations 1 and 2 are the populations with two-sided errors. Pilot test results indicated that, overall, the reliability of the proposed method is similar to that of the classical ratio.

⁶See footnote 4.

Tables 2-5. Results at 99% confidence level follow a similar pattern. SR, MR and CR in the tables denote respectively the Simulation Ratio, Modified Ratio and Classical Ratio.

Interpretation of results

The principal criterion for judging the performance of an interval estimator is its reliability (see for example Reneau, 1978, p. 673; Dworin and Grimlund, 1984, pp. 223, 229; and Chan and Tryfos, 1984, p. 314). The precision is a secondary criterion for choosing among reliable estimators. This means that reliability is the first screening device in choosing among alternative estimators. An estimator is considered reliable if, for a given study population and sample size, its actual (simulated) reliability is not significantly below the nominal confidence level. Within the class of reliable estimators, the one with the best precision should be chosen.

Table 2 shows that at low error rates (0.5% and 1%) all three methods have a reliability problem, i.e., actual reliability below the nominal confidence level. However, SR provides the best reliability in ten out of twelve cases. Reliability for all methods improves as sample size increases. Therefore, when sample size keeps increasing, SR is likely to be the first to achieve nominal level reliability. At medium error rate (5%), reliability for SR reaches the nominal level beginning with samples of 100. SR reliability is significantly better than the reliability of CR or MR at all sample sizes. At high error

rates (10% and 30%), again SR provides the best reliability. In fact, SR is the only method that can reach the nominal confidence level. However, at 30% error rate, SR provides very conservative bounds. The rather erratic tainting distribution of this population may explain the problem. The only case where CR reliability is close to the nominal confidence level is when error rate is 30% with sample size 200. In this case, CR should be the preferred method as it provides the best precision. For Population 3, MR is the most unreliable method in all cases. Behaviour at the 90% confidence level as shown in Table 3 is similar to that at the 95% confidence level.

Results for Population 4 are shown in Tables 4 and 5, with SR providing the best reliability at low error rates. MR comes in second, with CR being the most unreliable. At medium error rate of 5%, SR again provides the best reliability, reaching the nominal confidence level beginning at samples of 100. No other method can reach the nominal confidence level at this error rate. At 10% error rate, SR reliability reaches the nominal confidence level beginning at sample sizes of 50 and 40 respectively for 95% and 90% confidence levels. MR reliability reaches the nominal confidence level at sample size of 100 for the 95% confidence level. At the high error rate of 30%, SR is reliable at all sample sizes and confidence levels. Compared with the results of Population 3, the precision for the three methods is much more similar here. With a 30% error rate, MR is slightly below the nominal level at the 95% confidence level and around the

Table 2
Comparative Reliability and Precision of Three Ratio Estimators
at 95% Confidence Level: Population 3

Error Rate	Estimator	Reliability						Precision					
		Sample Size						Sample Size					
		30	40	50	60	100	200	30	40	50	60	100	200
0.5%	SR	9	13	15	19	31	52	0.5	0.4	0.4	0.5	0.5	0.5
	MR	1	3	2	6	8	12	0.0	0.1	0.0	0.1	0.1	0.1
	CR	8	13	16	16	27	41	0.1	0.1	0.1	0.1	0.1	0.1
1%	SR	22	25	29	35	50	72	1.2	1.1	1.1	1.1	1.1	0.9
	MR	5	6	6	10	10	18	0.1	0.1	0.1	0.3	0.2	0.2
	CR	21	24	27	28	39	57	0.1	0.1	0.1	0.1	0.1	0.1
5%	SR	69	74	81	85	95	100	5.4	5.0	4.6	4.6	4.0	3.4
	MR	12	17	15	23	30	46	0.6	0.7	0.6	0.7	0.5	0.5
	CR	54	57	60	58	72	79	0.6	0.5	0.4	0.4	0.4	0.3
10%	SR	86	92	96	97	100	100	9.6	9.0	8.3	8.0	7.1	6.2
	MR	21	31	27	32	43	59	1.2	1.4	1.1	1.2	1.0	0.9
	CR	65	68	72	73	81	87	1.1	1.0	0.9	0.9	0.8	0.6
30%	SR	100	100	100	100	100	100	21.9	20.4	19.5	18.8	17.1	15.7
	MR	42	50	57	59	79	85	3.1	2.9	2.9	2.8	2.7	2.2
	CR	83	88	88	89	91	94	3.2	2.8	2.6	2.5	2.3	1.9

Table 3
Comparative Reliability and Precision of Three Ratio Estimators
at 90% Confidence Level: Population 3

Error Rate	Estimator	Reliability						Precision					
		Sample Size						Sample Size					
		30	40	50	60	100	200	30	40	50	60	100	200
0.5%	SR	9	13	15	18	31	52	0.3	0.3	0.3	0.3	0.4	0.4
	MR	1	3	2	6	7	12	0.0	0.1	0.0	0.1	0.1	0.1
	CR	8	13	16	16	27	41	0.0	0.1	0.1	0.0	0.1	0.0
1%	SR	20	24	29	35	50	71	0.9	0.8	0.8	0.8	0.8	0.7
	MR	3	6	3	8	10	18	0.1	0.1	0.1	0.2	0.2	0.1
	CR	20	23	26	26	38	55	0.1	0.1	0.1	0.1	0.1	0.1
5%	SR	68	73	81	83	94	100	4.3	4.1	4.0	3.8	3.5	3.1
	MR	12	17	15	23	27	46	0.5	0.6	0.5	0.6	0.4	0.4
	CR	52	55	57	56	69	73	0.5	0.5	0.4	0.4	0.4	0.3
10%	SR	85	91	95	97	100	100	7.9	7.6	7.1	6.9	6.3	5.7
	MR	21	31	25	32	43	58	1.0	1.2	0.9	1.0	0.9	0.7
	CR	63	64	69	71	77	81	1.0	0.9	0.8	0.8	0.7	0.6
30%	SR	100	100	100	100	100	100	19.6	18.5	17.8	17.3	15.9	14.9
	MR	42	47	56	58	78	80	2.7	2.6	2.6	2.5	2.4	2.0
	CR	80	83	84	84	87	89	2.9	2.5	2.4	2.3	2.1	1.8

nominal level at the 90% confidence level. For population 4, the reliability of CR is far below the nominal confidence level in all cases.

In summary, no method including SR is reliable at very low error rates (1% or less) particularly with smaller samples. However, relatively speak-

ing, SR is the most reliable method. This means that if the auditor is willing to take a larger sample, SR will have the best chance of providing a reliable bound. At 5% error rate, SR is reliable with samples of 100 or larger. At 10% and 30% error rates, SR is generally quite reliable.

Table 4
Comparative Reliability and Precision of Three Ratio Estimators
at 95% Confidence Level: Population 4

Error Rate	Estimator	Reliability						Precision					
		Sample Size						Sample Size					
		30	40	50	60	100	200	30	40	50	60	100	200
0.5%	SR	14	18	22	24	35	50	1.3	1.2	1.2	1.2	1.1	0.9
	MR	13	12	18	18	28	48	1.7	1.3	1.5	1.3	1.2	1.2
	CR	10	11	14	13	21	26	0.8	0.7	0.7	0.8	0.8	0.8
1%	SR	23	29	33	37	48	73	2.0	2.0	1.9	1.9	1.8	1.6
	MR	25	27	30	26	36	57	2.2	1.9	2.0	1.7	1.6	1.4
	CR	17	18	27	26	30	45	1.1	1.1	1.1	1.2	1.1	1.1
5%	SR	61	72	78	86	96	100	7.7	7.4	7.0	6.9	6.0	5.2
	MR	47	47	49	50	69	90	5.0	4.4	4.4	3.9	3.6	2.9
	CR	42	44	52	48	57	71	3.6	3.2	3.2	3.2	3.1	2.8
10%	SR	86	93	98	98	100	100	13.6	13.0	12.4	11.9	10.6	9.3
	MR	61	74	82	85	95	95	9.9	9.7	8.9	8.4	7.1	6.0
	CR	49	52	55	51	62	69	9.4	8.7	7.9	7.2	7.0	6.9
30%	SR	98	98	98	99	100	100	30.3	28.8	27.6	26.9	25.1	23.2
	MR	92	91	93	94	94	94	25.9	24.1	23.0	22.4	20.2	18.3
	CR	58	67	65	67	75	83	28.5	29.5	28.0	25.3	24.5	22.6

Table 5
Comparative Reliability and Precision of Three Ratio Estimators
at 90% Confidence Level: Population 4

Error Rate	Estimator	Reliability						Precision					
		Sample Size						Sample Size					
		30	40	50	60	100	200	30	40	50	60	100	200
0.5%	SR	14	18	22	23	33	50	0.9	0.9	0.9	0.9	0.8	0.7
	MR	13	12	18	18	28	46	1.4	1.1	1.2	1.0	1.0	1.0
	CR	10	10	13	13	18	24	0.7	0.6	0.6	0.7	0.7	0.7
1%	SR	22	28	30	35	48	73	1.4	1.5	1.4	1.4	1.3	1.3
	MR	25	21	25	25	36	57	1.9	1.5	1.7	1.4	1.3	1.2
	CR	16	17	24	23	29	38	1.0	0.9	1.0	1.1	0.9	1.0
5%	SR	61	71	78	86	96	98	6.1	6.1	5.8	5.9	5.3	4.7
	MR	44	40	46	48	69	87	4.2	3.7	3.7	3.3	3.1	2.6
	CR	39	41	49	45	54	67	3.2	2.8	2.8	2.8	2.7	2.5
10%	SR	86	93	98	96	100	100	11.6	11.3	10.9	10.6	9.6	8.7
	MR	61	74	82	85	84	88	8.6	8.4	7.8	7.4	6.4	5.4
	CR	46	49	50	48	57	65	8.2	7.6	6.9	6.3	6.2	6.1
30%	SR	95	97	96	97	99	100	27.6	26.4	25.5	25.0	23.7	22.2
	MR	92	90	91	90	89	89	23.5	22.1	21.1	20.7	18.9	17.4
	CR	54	63	63	63	72	78	25.3	26.3	25.0	22.7	22.2	20.8

Finally, CR requires only a negligible amount of computational (CPU) time to generate an error bound because of the availability of the normal probability table. MR requires more computational time because users normally have to generate the C value tables. SR will require the largest amount of computational time. The CPU time required to generate one error bound using the simulation method is about 10 seconds on the minicomputer VAX2. Naturally, computational time can be reduced substantially by using faster computers, such as the IBM Sierra series.

Conclusions

By explicitly considering the special characteristics of accounting variables involved in audit inferences and by simulating the estimator's distribution for which the analytical derivation is intractable, the simulation ratio is able to do what the Jackknifed ratio fails to do. It significantly improves the reliability of the classical ratio estimator in situations where the classical estimator is known to be unreliable and needs improvement. The results of this study show that, within the range of the sample size auditors normally use in practice, the simulation ratio provides better reliability—in most cases significantly better reliability—than the classical ratio at all error rates and confidence levels for both populations. (It is interesting to note that the reliability of the simulation ratio also appears to be significantly better than the reliability of the stratified ratio estimator and the

dollar-unit ratio estimator studied by Neter and Loebbecke, 1975, pp. 99–100, 123). However, the simulation ratio sometimes provides very conservative bounds. The performance of the modified ratio based on dollar-unit sampling was mixed. It was less reliable than the simulation ratio. It performed poorly in Population 3. In Population 4 with 30% error rate, its reliability is close to the nominal confidence level. Overall, given that reliability is the main concern, the simulation ratio should be superior to other methods of ratio estimation in constructing reliable confidence intervals for the population total error.

Future research on the simulation approach may include testing alternative distributions such as gamma or beta for \bar{T} , as well as possibly additional partitioning of the tainting distribution to isolate other distinct components of the distribution. Consequently, the results in this paper reflect the current form of the proposed approach, and do not necessarily imply that it is not possible to identify an improved form.

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The Association Between Qualified Opinions and Auditor Switches

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Abstract—The question of whether auditors who qualify their opinions are more likely to face dismissal is investigated. The evidence presented in respect of Australian practice is consistent with managers' switching auditors more frequently following qualification, with 'new' auditors giving unqualified opinions, and with the likelihood of an unqualified opinion being independent of the type of qualification and whether the 'new' auditor was Big Eight or non Big Eight.

Introduction

The literature of accounting contains many references to the possibility that auditors who qualify their reports face dismissal. For example, as early as 1904, Dodd discussed the role of auditors in Australia and suggested that it was the view of managers that 'a too vigilant watch-dog must be cleared out, and one of less pronounced efficiency substituted for him' (1904, p. 777). In 1963, in England, the directors of the City of London Real Property Company Limited reacted to the qualification of the company's accounts by attempting to dismiss the auditor.¹ However, following public criticism of their proposed action, the directors did not proceed with their plans. More systematic evidence of the association between audit qualifications and auditor switches is available in Chow and Rice (1982a), and Schwartz and Menon (1985). However, in both of these studies, the evidence is drawn from the United States where the system of regulation differs from that in force in other English-speaking jurisdictions.

The existence of an association between qualified audit opinions and auditor switches has important policy implications. If managers change auditors following qualification, regulators may be concerned about the threat of dismissal on auditors' independence. If managers can avoid subsequent qualifications as a result of changing auditors, regulators may be concerned about

auditors satisfying their legal and professional obligations. That these are real concerns for regulators in the US is evident in the publicity that has been given to so called 'opinion shopping'.² However, outside the US, the extent of the problem has not been documented. The aim in this paper is to present evidence on the association between qualified opinions and auditor switches in a legal and professional environment similar to that in the UK by analysing the factors likely to affect Australian managers' decisions to switch auditors. Evidence of this sort is a necessary precursor to any investigation of the policy implications of managers changing auditors following qualified audit opinions.

Qualified audit opinions and auditor switching

The hypothesised association between qualified opinions and auditor switches is based upon the assumptions that: (a) there are costs associated with receiving qualified opinions; (b) managers wish to avoid these costs; and (c) this can be achieved by switching auditors.³ Arguments and evidence in respect of (a) are reviewed below. While the arguments seem to suggest that qualifications are costly and that costs increase with the severity of qualification, the evidence is

*The author is associate professor of accounting in the University of Sydney. He thanks Greg Whittred, Peter Brownell, Graeme Dean, Stephen Taylor and an anonymous referee for their helpful comments on earlier versions of the paper. Financial support from the Sydney office of Peat Marwick Hungerfords is gratefully acknowledged.

¹In the UK and Australia the statutory obligation to appoint auditors rests with the shareholders. However, in practice, executive and other directors, that is, the managers of the company, have effective power through their nomination of the auditor and their control over the annual general meeting.

²Knapp and Elikai (1988) include in their list of references articles on 'opinion shopping' in *The Wall Street Journal*, *Business Week* and the *New York Times*. In an article in *World Accounting Report* (November 1987), SEC attempts to control the practice are criticised by the AICPA who reportedly claim that the SEC are 'proposing extensive rules to deal with abuses that are relatively rare' (p. 6).

³In some cases managers may be able to anticipate an auditor's qualification and, thus, avoid the costs of a first-time qualification. These particular cases are difficult to identify and, consequently, in this study, managers are assumed to wish to avoid the costs of subsequent qualifications.

mixed. Proposition (b), given (a), seems plausible, although it is important to realise that switching itself is not costless. Whether or not switching actually avoids the presumed costs is a question upon which evidence is difficult to collect and, therefore, is scarce. However, the argument is based on a belief that switching avoids a subsequent qualification (and any associated costs). Evidence relating to this issue is presented later.

Costs of Qualified Opinions

A number of costs may be imposed upon firms following a qualified audit opinion. For example, Chow and Rice (1982a) refer to the costs associated with capital market effects and managers' compensation. In addition, qualified opinions may result in an increase in audit costs.

Results concerning the capital market effect of audit qualifications are uncertain. Research by Ball *et al.* (1979), Davis (1982), Dodd *et al.* (1984) and others, has generally been unable to attribute price responses to 'subject to' audit qualifications *per se*.⁴ However, negative price effects have been identified with the more serious types of qualifications.⁵ Firth (1978) found price decreases around the time of the release of 'going concern', 'asset value' and 'general' qualifications and Chow and Rice (1982b) identified a similar effect in respect of 'asset valuation' qualifications.

To the extent that market prices of common stock are affected by qualified opinions, managers' compensation based upon stock or stock options is also affected. In addition, where qualified opinions result in a reduction in reported income, managers may suffer a reduction in both pecuniary and non-pecuniary benefits.⁶

Qualified opinions may prolong the audit process resulting in additional costs of auditing. Whittred (1980) examined the reporting behaviour of a sample of qualified and unqualified companies and found that, where the audit opinion was qualified, the release of the annual accounts was

delayed and the length of the reporting lag was related to the seriousness of the qualification.

There are a number of possible explanations for this effect. For example, Whittred (p. 576) attributes the delay to 'an apparent increase in the year-end audit time and an almost certain increase in auditor-client negotiation time as a result of the impending qualification'. The additional audit time and costs are likely to be a result of underlying uncertainties of which an audit qualification is merely a signal. Consequently, removal of the qualification may not lead to the expected cost reductions.

Both the capital market research and that of Whittred suggest that the costs associated with qualified opinions are an increasing function of the seriousness of the qualification. Consequently, the more serious the qualifications, the greater a manager's incentive to avoid them.

Costs of Auditor Switches

DeAngelo (1981) identifies the costs associated with auditor switches as those related to the *economic interest* of the managers in the continuation of the present auditor, the transactions costs of changing auditors, and the costs of complying with regulations requiring the disclosure of circumstances surrounding auditor changes.

(i) Economic interest

DeAngelo (1981) suggests that clients' *economic interest* in their auditors is a consequence of significant start-up costs involved in initial audit engagements. For example, Arens and Loebbecke (1984, p. 246) compare initial and repeat audit engagements and identify a number of areas in which it is necessary to perform 'more audit procedures for an initial engagement than for a repeat audit'. Generally, these relate to procedures involved in establishing opening balances of accounts and in becoming familiar with clients' operations. Because of their nature, the extent of these start-up costs is a function of the size and nature of the firm's operations. Correspondingly, auditors have an *economic interest* in the specialised knowledge they have acquired in respect of their clients and both auditors and clients have an incentive to maintain an established relationship by resolving disagreements and avoiding qualified opinions.

(ii) Transactions costs

The transactions costs of changing auditors include the search costs of finding a new auditor and the costs of complying with regulations requiring disclosure of the circumstances surrounding the auditor changes. Managers changing auditors following a qualified opinion are faced with the problem of finding a replacement auditor who is

⁴For a review of capital market and experimental studies of the impact of qualified opinions see Craswell (1985). In a recent paper, Dopuch, Holthausen and Leftwich (1986) present evidence of significant negative price reaction associated with *media disclosure* of 'subject to' qualified opinions.

⁵The seriousness of a qualification depends upon the perceptions of the decision maker. For example, an investor's assessment may differ from a manager's which may differ from an auditor's. In this study, adverse opinions and disclaimers are considered to be serious qualifications. This classification is consistent with the hierarchy of audit opinions described in professional auditing standards (where adverse opinions and disclaimers are considered more serious than other qualifications) and with previous studies, such as Firth (1978) and Whittred (1980).

⁶Chow and Rice (1982a, p. 327) suggest that managers also incur costs where qualifications cause the reliability of reported earnings to be questioned.

less likely to qualify. Where the disagreement between the client and the auditor is trivial, search costs may also be trivial. However, where the qualification is serious, managers may have difficulty in identifying an auditor who would be willing to give a clear report. Consequently, it might be expected that search costs would also be positively correlated with the seriousness of the qualification.

(iii) *Costs of disclosing switches*

Other costs are imposed on firms switching auditors by regulations which require the disclosure of details of auditor changes. For example, in the United Kingdom, section 386 of the Companies Act requires notice of the removal of an auditor to be given to the registrar of companies. In addition, section 388 requires special notice to be given of any resolution to appoint an auditor other than the retiring auditor and the dissemination, to members of the company, of any representations by the retiring auditor. This policy of publicising the circumstances surrounding auditor dismissals is adopted also in the United States where the SEC requires the disclosure of the circumstances of any disagreements between managers and auditors (whether or not a compromise was reached) within the 18 month period prior to an auditor switch.⁷ Regulations such as these impose administrative costs upon firms changing auditors.

In Australia, legislation introduced in the uniform *Companies Act 1961* requires managers to give notice of an intention to switch auditors and to circulate, at the companies' expense, auditors' representations of the circumstances of the changes. To ensure that managers comply with their statutory obligations in respect of the appointment and dismissal of auditors, a statutory body, the Companies' Auditors Board, is charged with supervising compliance with the legislation. These Australian legislative provisions impose costs on companies wishing to replace their auditors and are similar in effect to both the UK and US requirements.

DeAngelo (1981) suggests that such legislative provisions, to the extent that auditors are encouraged to withstand client pressures, may have resulted in a strengthening of auditor independence. Therefore, following the changes, auditors may have been more inclined to qualify their opinions. However, DeAngelo indicates (p. 47) that such regulations may also have the opposite effect: 'the regulation may have impaired auditor independence by enabling auditors to raise future audit fees'. The introduction of institutional arrange-

ments involving auditor switches results in costs being imposed on companies, and interpretations of the impact of such costs may be confounded by changes in the regulations.⁸

The possibility that disclosure of the circumstances surrounding auditor switches could give rise to capital market effects was investigated by Fried and Schiff (1981). They hypothesised (1981, p. 327) that 'a CPA switch may be viewed by the market as an information signal of changing economic conditions for the companies'. Although Fried and Schiff (p. 339) found some evidence of negative market reaction, they expressed difficulty in providing an explanation for their result. Subsequently, Smith and Nichols (1982) undertook an examination of the market reaction to auditor-firm disagreements using a larger sample and found that investors' adverse reactions were significantly greater if auditor changes followed a disagreement between managers and auditors. The evidence from this later study appears to support the suggestion that changing auditors following qualifications also incurs costs. However, their evidence may not be entirely valid outside the US.

The majority of the disagreements examined by Smith and Nichols related to accounting principles. In the US, non-compliance with generally accepted accounting principles is not acceptable in the accounts of listed companies. Consequently, if managers and auditors disagree over the appropriate method of accounting, their disagreements must be resolved prior to the accounts being filed with the SEC and investors would become aware of such disagreements only in the event that auditors are dismissed. Thus, investors could be expected to react to the release of this 'new' information in the Form 8-K. In the UK and Australia, qualifications for non-compliance with accounting standards are not prohibited and investors would not necessarily need to wait for the dismissal of the auditor to become aware of a disagreement over accounting principles. This would suggest that the reaction of investors to auditor dismissals would depend upon whether, as a result of the dismissal, they became aware of the circumstances affecting the value of the firm in addition to information disclosed previously in an auditor's report.

The Decision to Switch Auditors

The above analysis implies that there may be non-trivial costs associated with qualified opinions.

⁷The original provision, which required Form 8-K disclosure, was Release No. 34-9344. This was amended by ASR 165 (1975), ASR 194 (1976) and ASR 247 (1978).

⁸In studies using data on auditor switches in the US, sample selection procedures would need to accommodate changes to the SEC rules in 1975, 1976 and 1978. This would not seem to be a problem for the Chow and Rice (1982a) study where the sample related to the years 1973 and 1974. However, Schwartz and Menon (1985) sampled companies from the period 1974 to 1982.

Table 1				
Frequency of Auditor Switches Following First-time Qualification				
<i>Time from qualification to switch</i>	<i>Time period</i>			<i>Total</i>
	<i>1950-1961</i>	<i>1962-1970</i>	<i>1971-1979</i>	
One year	3	10	25	38
Two years	2	1	15	18
Three years	2	4	12	18
Four years	0	0	5	5
Five years	1	1	9	11
Total number of switches	8	16	66	90
Number of qualified reports	73	72	493	638

It also implies that the costs are likely to be a function of the seriousness of the qualification. Managers may be able to avoid these costs in a number of ways. They may engage in negotiations with the auditors in an attempt to reach a compromise. As noted above, their respective economic interests provide an incentive for managers and auditors to continue their current relationship. Whether a compromise can be reached will depend upon the nature of the qualification and the costs of compromising. For example, if an auditor is planning to issue a consistency exception, managers may avoid the qualification by adopting consistent accounting methods. Alternatively, the auditor may disagree with the reported value of accounts receivable and, following negotiation, may be prepared to compromise. However, auditors may be unlikely to compromise on serious qualifications such as 'going concern' qualifications.

If a compromise cannot be reached, managers must weigh the costs of qualifications against the costs of switching. As noted above, the former costs are positively related to the seriousness of the qualification. However, some of the latter costs (for example, start-up costs) are independent of the type of qualification. Consequently, for serious qualifications, managers may be expected to prefer to switch auditors to avoid qualified opinions.⁹ For less serious qualifications, the optimum strategy may be to accept the qualified opinion.

Empirical evidence of auditor switching

The qualified audit opinions examined were those identified in Craswell (1986). This data base was obtained by examining the annual reports of companies listed on the Sydney Stock Exchange

during the period 1950 to 1979. A total of 28,371 annual reports of industrial companies and 5,151 of mining companies were examined. For the industrial companies, 2,043 reports issued by 638 companies contained qualified audit opinions as did 697 reports of 196 mining companies. In this study, only the first-time qualifications in respect of the 638 industrial companies are considered. In respect of each of these companies, changes of auditor were identified as those occurring at any time five years subsequent to the year of first qualification.¹⁰ The frequencies are set out in Table 1. The time period partitioning reflects the different institutional and regulatory frameworks discussed in section 2.

In previous studies (Chow and Rice, 1982a; Schwartz and Menon, 1985), auditor switches were assumed to be associated with qualified opinions if they occurred within *one* year of qualification. The approach assumes that managers have sufficient notice of an impending qualification to be able to complete their search for a replacement auditor in time to have the new auditor appointed for the subsequent reporting year. In this study, only the 38 companies which switched auditors one year after first qualification (see Table 1) were included in the initial analysis. While this approach allows comparability with previous studies, it results in the exclusion of some switches which may be associated with qualifications, thereby biasing any tests against finding an association.

As a comparison group, a random sample of 15 per cent of the unqualified industrial company reports issued during the period 1950 to 1979 was selected. This sample was also partitioned according to whether an auditor change occurred within one year.

⁹Of course, whether or not the costs of qualifications will also be avoided is a moot point. However, all that is necessary is that managers *expect* these costs to be reduced.

¹⁰A switch was deemed to have occurred only if the audit assignment was undertaken by another audit firm and a different auditor. Thus, the set of auditor switches excluded amalgamations and mergers of audit firms and name changes.

Table 2
Frequency of Auditor Switches for Qualified and Unqualified Companies

Auditor status	Time period			Total
	1950-1961	1962-1970	1971-1979	
<i>Companies with first-time qualifications</i>				
Switched	3	10	25	38
Non-switched	70	62	468	600
Total	73	72	493	638
Proportion switching	0.04	0.14	0.05	0.06
<i>Unqualified companies</i>				
Switched	30	29	45	104
Non-switched	1943	1725	1485	5153
Total	1973	1754	1530	5257
Proportion switching	0.02	0.02	0.03	0.02
Chi-square value with 1 d.f.	1.57	43.85*	4.45*	36.62*
*Significant at the 0.05 level.				

*Significant at the 0.05 level.

As noted above, the costs of auditor switches may be affected by changes in institutional arrangements. In Australia, these costs may have been affected by changes to both legal and professional regulations. *Companies Act* provisions governing the appointment and dismissal of auditors were introduced in 1961 and, early in 1971, the Institute of Chartered Accountants in Australia issued *Statement K1: Conformity with Institute Technical Standards*. The effect of this statement was to require compliance with recommended accounting techniques and, if managers did not comply, auditors were required to give non-compliance qualifications. This change in professional obligations resulted in a dramatic increase in the frequency of qualified opinions.

In the 1950s and 1960s, an average of two per cent of auditors' opinions in Australia were qualified. In contrast, in the following decade, the average rate of qualified opinions was twenty per cent (Craswell, 1986). Changes in the propensity of auditors to qualify their reports may have resulted in changes in the relative costs of qualified opinions and auditor switches, and, as a consequence, managers' incentives to switch auditors may have altered.

To accommodate these potential problems, the samples of qualified and unqualified companies were partitioned into three periods of approximately equal duration corresponding to the differing institutional arrangements identified above. Details of the frequency of auditor switches together with chi-square values for tests of the independence of the classifications are reported in Table 2.

As shown in Table 2, in the period 1950-1961, the number of auditor switches is small (only three) and the proportion of qualified companies switch-

ing (0.04) is not significantly different from the control group (0.02). However, overall and in respect of the two other time periods, the proportions of auditor switches for companies with first-time qualifications are significantly greater than for the control group of unqualified companies. This evidence is consistent with an association between auditor switches and qualified audit opinions.

The proportion of switches for unqualified companies, set out in Table 2, appears to be fairly stable over time at around 0.02. However, for companies with first-time qualifications, the proportion declines significantly from 0.14 in period two to 0.05 in period three ($\chi^2 = 6.96$ with 1 d.f.). It is also noticeable that, in the period 1971-1979, the increase in the frequency of first-time qualifications was approximately seven times while the number of auditor switches increased 2.5 times. This evidence suggests that the changes in the institutional arrangements described above resulted in a change in managers' perceptions of the relative costs of qualified opinions and auditor switches. The identification of the precise nature of these changes in perceptions is beyond the scope of this paper.

It is hypothesised above, that the costs of qualified opinions are likely to be a function of the seriousness of the qualification. To test this, the set of qualified companies was partitioned according to the type of qualification. The classification scheme used is similar to that described in Whittred (1980) and consists of three types. Disclaimers and adverse opinions, as well as opinions in which a number of different reasons are cited, are classified as *serious*. *Non-compliance* qualifications, the second type, are those in which auditors have expressed differences of opinion about

Table 3
Frequency of Audit Switches by Type of Qualification

Auditor status	Time period		Total
	1950-1970	1971-1979	
Serious qualifications			
Switched	2	7	9
Non-switched	12	52	64
Total	14	59	73
Proportion switching	0.14	0.12	0.12
Non-compliance qualifications			
Switched	2	6	8
Non-switched	16	259	275
Total	18	265	283
Proportion switching	0.11	0.02	0.03
Other qualifications			
Switched	9	12	21
Non-switched	104	157	261
Total	113	169	282
Proportion switching	0.08	0.07	0.07
Chi-square value with 2 d.f. ^a	0.73	11.44*	9.88*

*Significant at the 0.05 level.

^aRefers to the test of the difference in the proportions of switches for different types of qualifications.

*Significant at the 0.05 level.

^aRefers to the test of the difference in the proportions of switches for different types of qualifications.

the methods of accounting adopted by the managers. Such qualifications have been referred to as 'technical qualifications', have been described as 'minor' (Renshall, 1978), and are similar to the 'SSAP qualifications' for which Firth (1978) could not identify a capital market effect. All other qualified opinions were included in a third group. In this latter group, auditors had referred to breaches of the *Companies Act* and disagreements over the valuation of balance sheet and income statement items. Details of the frequency of the different types of qualifications are provided in Table 3. Because there were only three auditor switches following first-time qualifications in the period 1950-1961, these observations are, hereafter, pooled with those for the period 1962-1970.

In respect of qualifications referring to non-compliance with accounting standards, the proportion of switches pre-1971 is not significantly different from the proportions for other types of qualifications. However, the proportion of companies switching auditors following this type of qualification, in the period 1971-1979, is only 0.02 which is significantly less than the proportion of switches for the other types of qualifications. This is consistent with non-compliance qualifications, post-1971, being regarded as having little economic significance and as the least serious of the qualifications examined.

The argument for an association between qualified opinions and auditor switches is based upon the assumption that, by switching auditors,

a clean opinion is obtained and the costs of subsequent qualifications can be avoided. To test this, the sample of companies reporting first-time qualifications was examined to ascertain the frequency with which companies received a qualified opinion (of any type) in the year following the first qualification. Details are set out in Table 4.

The evidence presented in Table 4 indicates that, in both time periods and overall, the proportion of companies obtaining clean opinions after switching auditors is greater than the respective proportion for companies which did not change auditors. Using a chi-square test, the proportion of clear opinions for switching companies, 0.66, is significantly different from the proportion for companies not switching, 0.43, at the 0.05 level. This evidence is consistent with managers avoiding subsequent qualifications by switching auditors.

While the evidence in Table 4 is consistent with managers avoiding subsequent qualifications by switching auditors, it would be dangerous to infer causality. Qualified audit opinions may not be repeated for a variety of reasons. For example, irrespective of whether managers changed auditors, the problem giving rise to the first-time qualification may have been resolved, as when a liability ceases to be contingent following the handing down of a decision in a court case; managers may have adopted auditors' recommendations by, for example, complying with professional accounting standards; or new evidence may have become available which caused the auditors to change their

Table 4**Frequency of First-time Qualifications Repeated in the Following Year
(by Auditor Status)**

Qualification	Time period		Total
	1950-1970	1971-1979	
<i>Companies switching auditors</i>			
Repeated	2	11	13
Not repeated	11	14	25
Total	13	25	38
Proportion not repeated	0.85	0.56	0.66
<i>Companies not switching auditors</i>			
Repeated	53	288	341
Not repeated	79	180	259
Total	132	468	600
Proportion not repeated	0.60	0.38	0.43
Chi-square value with 1 d.f.	2.12	2.37	6.52*

*Significant at the 0.05 level.

*Significant at the 0.05 level.

opinions and to adopt the managers' view of, say, an asset's realisable value.

Notwithstanding these alternative explanations, auditors may not be maintaining their independence from managers and managers may be able to circumvent legal and professional rules by changing auditors. Although these policy implications of auditor switches cannot be investigated fully in this paper, it is possible to consider whether the likelihood of qualification subsequent to an auditor switch is linked to the type of qualification given prior to the switch and to the size of the audit firm.

The data set used to test these linkages was extended beyond the 38 auditor switches analysed above. If the 'first-time qualification' restriction is removed, an additional 38 observations of auditor switches occurring in the year immediately following a qualification can be identified. These 76 auditor switches, which relate to 70 companies, can be used to test whether subsequent qualification is related to the nature of the prior qualification and

whether different types of audit firms are more likely to qualify subsequent reports. The results of these tests are set out in Tables 5 and 6.

Details of the frequency with which companies, with different types of qualified opinions, received qualified opinions after switching are contained in Table 5. On the basis of this evidence, it would appear that the proportion of companies obtaining an unqualified opinion subsequent to switching auditors is independent of the type of prior qualification. That is, irrespective of whether the prior qualification was *serious*, *non-compliance* or *other*, the proportion of companies receiving a clear opinion subsequent to a change in auditor is not significantly different and is approximately 0.60.

The frequencies with which switching to Big Eight and to non-Big Eight auditors led to subsequent qualification are set out in Table 6. For the sample of 76 auditor switches, the proportion of subsequent qualifications for Big Eight auditors

Table 5**Frequency of Qualification Subsequent to Switching Auditors by Type of Qualification Prior to the Switch**

Type of audit report subsequent to the switch	Type of qualification prior to the switch			Total
	Serious	Non-compliance	Other	
Unqualified	10	10	25	45
Qualified	8	9	14	31
Total	18	19	39	76
Proportion unqualified	0.56	0.53	0.64	0.59
Chi-square value 0.83 with 2 d.f.				

Table 6
Frequency of Qualification Subsequent to a Change of Auditor by Type of Auditor

<i>Type of audit report subsequent to the switch</i>	<i>Type of auditor subsequent to the switch</i>		<i>Total</i>
	<i>Big Eight</i>	<i>non-Big Eight</i>	
Qualified	7	24	31
Unqualified	14	31	45
Total	21	55	76
Proportion unqualified	0.67	0.56	0.59
Chi-square value 0.31 with 1 d.f.			

(0.33) is not significantly different, at the 0.05 level, from that for non-Big Eight auditors (0.44). It would appear that managers are not switching to smaller and, perhaps, less economically independent auditors in order to obtain unqualified opinions.

Prior studies

In previous studies, Chow and Rice (1982a) provided evidence that auditor switches are more likely to occur following qualification while Schwartz and Menon (1985, p. 256) found that 'a higher proportion of those companies that had *not* received a prior qualified opinion had switched auditors' (emphasis added). Insights into these conflicting results may be obtained by comparing the proportions of switches in each of the studies. These are set out in Table 7. For the qualified group, the proportions reported in the earlier studies (0.12 and 0.15) are similar to that identified in this study for serious qualifications (0.12). For the unqualified group, the proportion in Chow and Rice (0.03) is similar to that found in this study (0.02). The Schwartz and Menon proportion (0.33) is greater than might be expected and may be a consequence of their sampling procedures. Their initial sample consisted of 132 bankrupt companies and their unqualified comparison sample com-

prised a subset of those bankrupt companies (that is, they were interested in the phenomenon of auditor switches in failing firms). Consequently, the Schwartz and Menon result is likely to be a product of the methods used to select the unqualified group of companies.

Conclusions

In this paper, managers' decisions to switch auditors have been presumed to be based upon the costs and benefits of alternative actions. A number of potential costs associated with audit qualifications and auditor switches were identified and the available evidence on the nature of those costs was reviewed. Although the evidence on the costs is scant, it would appear that the costs of qualifications are directly related to the seriousness of the qualifications. Consequently, following serious qualifications, managers would have an incentive to switch auditors if, by doing so, they expected to avoid the costs of qualifications. The evidence that is presented in respect of Australian practice is consistent with managers switching auditors more frequently following qualification, with 'new' auditors giving unqualified opinions, and with the likelihood of an unqualified opinion being independent of the type of qualification and whether the auditor was one of the Big Eight.

Table 7
Proportions of Auditor Switches

	<i>Chow and Rice</i>	<i>Schwartz and Menon</i>	<i>Current study</i>			
			<i>Serious</i>	<i>Non- compliance</i>	<i>Other</i>	<i>Total</i>
Qualified	0.12	0.15	0.12	0.03	0.07	0.06
Unqualified	0.03	0.33	NA ^a	NA	NA	0.02

^aThese proportions are not appropriate.

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Spin-offs and Sales of Assets: An Examination of Security Returns and Divestment Motivations

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Abstract—Event study research to date has generally used the cumulative average residuals technique and focused on stockholder announcement impacts while testing one or two hypotheses concerning divestment. There are two important reasons for departing from this tradition. First, recent evidence suggests that an examination of cross-sectional cumulative average residuals may result in detecting abnormal performance when none is present. Second, most of the hypotheses concerning divestment are consistent with positive returns to stockholders.

This research isolates the impact of divestment on security holders by examining firms that have a single major divestment and no other seemingly important news events. The impacts at the announcement period and the divestment period are examined for subsamples of firms according to managerial motivations for divestment. Results indicate that when the sample is categorised this way, divestiture impacts vary between categories.

Introduction

The study of the impact of divestment on security holders of the firm has only recently begun to receive the attention of financial economists. The event study research to date has, for the most part, used the cumulative average residuals methodology and focused on stockholder announcement effects.¹ With one exception, research to date documents positive abnormal returns to stockholders in response to divestiture news.² However, recent evidence by Klein and Rosenfeld (1987) suggests that an examination of cross-sectional cumulative abnormal residuals may result in detecting abnormal performance when none is present. Specifically, when an event occurs during a bull (bear) market, both the mean-adjusted and the raw market-returns models produce upwardly (downwardly) biased positive (negative) abnormal returns. This is likely to occur even in the absence of the clustering of events in calendar time. In contrast, the market-adjusted model shows less evidence of bias. Since it may be that the firms

selected for analysis in previous divestiture studies are disproportionately representative of bull or bear markets, this study re-examines the market response to the event. The examination of three additional issues also motivates this research. The sample in this study isolates single divestiture events and segments firms into categories according to the economic rationales that might prompt divestment. Further, the impact of divestiture completion on stockholders is also examined.

The evidence presented here indicates that, when firms are categorised by factors which motivate divestment, such as agency cost reduction or losing operations, the return parameter changes associated with divestment are not consistent across categories. Typically there are large changes in mean returns to stockholders, but these changes are statistically significant only for the losing operations and spin-off samples. The variance of stockholder returns also changes in response to divestment except for the sample of firms for which no rationale is offered by management for the divestment. The majority of firms in the spin-off and losing operations sample appear to experience a significant increase in stockholder return variance, while the majority of firms in the agency sample experience a significant decrease.

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¹There is another area of divestiture research which focuses on organisational control issues and which suggests that both US and UK firms may disinvest in selected business activities for control or strategic reasons. For examples of this work see Duhaime and Grant (1984), Ezzamel (1985), Wright (1985), Wright and Coyne (1985) and Wright and Thompson (1987).

²See Alexander, Benson and Kampmeyer (1984) for evidence of insignificant divestiture impacts. See Denning (1986) and Wright *et al.* (1987) for a review of previous research.

Six economic rationales for divestment

In the literature of financial economics six basic hypotheses are offered as motivations for corporate divestment. Four of these are consistent with an observation of positive stockholder returns. Thus we cannot examine the stockholder

impacts associated with divestment, find them to be positive, and find unambiguous support for any of these hypotheses. We can, however, examine stockholder impacts in concert with the rationales offered by corporate management for evidence that divestment has its intended effect.

The No Effect Hypothesis

Klein (1985) offers the 'no effect' hypothesis for corporate divestment. In perfect capital markets, it may be that the divestment of a division is no different from the divestment of publicly traded stocks or bonds from the firm's portfolio. Therefore, no abnormal returns would be expected to be earned. Further, we can think of divestment as the mirror image of merger and then the empirical and theoretical findings concerning merger may be applicable, in reverse, to divestment. In the case of mergers, since investors can hold shares in both corporations before a merger, there may be no advantage to a merger.³ In reverse, the stream of earnings to a share, when divided, may result in no decrement to stockholder wealth because it may be possible for stockholders to hold a claim to both streams of post-divestment earnings.⁴ If evidence is to support this hypothesis, empirical results will have to show no statistically significant changes associated with divestment.

The Wealth Transfer Hypothesis

A second economic rationale for divestiture is the wealth transfer hypothesis. If firms are shareholder wealth maximising entities, the value of stock can be enhanced at the expense of debtholders by divesting the firm of some of its assets.⁵ This wealth transfer can result from either one of two factors. As Galai and Masulis (1976) point out, after divestment there are fewer assets backing the firm's debt and therefore the market value of debt decreases. Since the value of the firm is the sum of the values of debt and stock, a constant firm value implies that a decrease in the value of debt must be accompanied by an increase in stock value. Secondly, wealth transfers are possible if the sale or spin-off results in an increase in the variance of the parent company. Viewing stock as an option on the firm, riskier operations increase the value of the stock. Thus, stockholders have two mechanisms to transfer wealth from bondholders to

themselves, one by increasing the variability of returns on the firm's assets and the second by decreasing the asset base backing the firm's debt. An observation of an increase in stock values is consistent with this hypothesis.

The Losing Operations Hypothesis

Costly bankruptcy or financial distress is a market imperfection that has been suggested as a motivation for divestiture.⁶ The takeover by creditors of a firm involves legal and accounting fees and can involve increased production and financing costs and reduced sales. Firms may divest a unit due to loss-making operations in the unit or due to a desire to insulate the assets of the firm from unprofitable assets in the unit. Additionally, assets may be divested to meet debt service payments or to increase liquidity and thus reduce bankruptcy probability in the parent company.

The impact on stock values resulting from a divestment aimed at reducing bankruptcy probabilities is not clear. It has been argued by some that a reduction in the variance of returns on the firm's assets, and consequently the probability of default, leads to an increase in the value of debt that is exactly offset by a decline in the value of equity.⁷ On the other hand, divestment aimed at reducing bankruptcy probabilities is a positive NPV decision and should increase the value of the stock. Thus the predictions for stockholder impacts of this economic rationale for divestment are ambiguous.

Agency Problem Resolutions

Jensen and Meckling (1976) were among the first to write extensively about the agency problems of the firm. Two such problems are under-investment and managerial behaviour that does not maximise value. In the case of under-investment, Myers (1977) presents a theoretical argument that the presence of debt in firms that are otherwise value-maximising can cause firms to forgo profitable investments because the benefits go to bondholders. It then follows that if a subsidiary could be separated from a parent in such a way that would enable shareholders to benefit from growth opportunities without enabling bondholders to do so, divestiture would create value.

Similarly, divestment can be seen as a way to enhance managerial performance by separating differing managerial units or by providing some sets of managers with an ownership interest in the firm. As Wright and Thompson (1987) and Wright and Coyne (1985) point out, selling off divisions may ease (control) problems without adversely

³See Levy and Sarnat (1970) and Haugen and Langeteig (1975).

⁴This may be easier for spin-offs than for sales of assets, and it may be true that claims to the separated assets are not both publicly traded.

⁵Wealth transfers may be less probable with sales than they are with spin-offs. A sale may result in a cash inflow to the firm. Since cash is a riskless asset, the risk of the firm declines rather than increases with a sale. Thus, one suspects that wealth transfers resulting from sales are smaller than those resulting from spin-offs.

⁶See Magiera and Grunewald (1978) and Hite, Owers and Rogers (1987).

⁷See Rubenstein (1973), Higgins and Schall (1975), and Galai and Masulis (1976).

affecting the units of the firm that remain. Similarly, in order to decrease excessive perk consumption, if managers are provided, through a sale or spin-off, with shares in their division, the resultant decrease in perquisite consumption would increase firm value.

In both of the above examples, the agency problem resolution hypothesis predicts an increase in stock value resulting from divestment. In the case of the growth option situation, since the variance of an option is always greater than the variance of the underlying asset, divestments aimed at exercising growth options would result in a decrease in parent company variance.

Good News Information

The fifth hypothesis offered in the financial economics literature concerning divestment is the 'good news' signalling hypothesis. This hypothesis states that, if corporate management were trading one cash flow (the stream of receipts to the unit) for another (the sale price of the unit), with a resulting zero NPV, they would be indifferent toward doing so. Presumably then, management perceives the divestment to be a positive NPV transaction. The value-enhancing nature of divestment may result from the divested unit being better managed by its acquirer or from an increased economic synergy between the unit and the acquirer. If value can be increased by divesting, the divesting parent receives an economic gain from doing so; and stock values reflect this gain.

Bad News Information

The bad news information hypothesis can be contrasted with the good news hypothesis. Bad news could be signalled when divestment indicates management's negative perception of the firm's situation. Divestiture might be 'bad news' in that it foretells management's perceptions of poor liquidity, losing operations, inefficiencies or anergies.⁸ In these instances, stock values would decline with divestiture news.

Hypotheses Summarised

Examining the returns to stockholders and the variance of stockholder returns as a proxy for the variance of returns on the firm's assets can provide evidence which coincides (or fails to coincide) with managerial motivations for divestment.⁹ It must also be pointed out that these hypotheses are not mutually exclusive. For instance, there are only subtle differences between the bad news and the losing operations hypotheses. Further, empirical

Table 1
Summary of Implications of Economic Rationales for Divestiture

<i>Hypothesis</i>	<i>Impact on Stock</i>	<i>Impact on Firm Variance</i>
No Effect	0	No prediction
Wealth Transfer	+	+
Losing Operations	+ / 0 / -	-
Agency Problem		
Resolution	+	-
Good News	+	No prediction
Bad News	-	No prediction

evidence will only show the predominant or net effect of a divestment. Divestment might be prompted by a number of economic motivations. For instance, combining losing operations and wealth transfer motivations might lead to empirical results which are consistent with the no effect hypothesis. The reader can see that other combinations are also possible. Table 1 provides a summary of the implications of the economic rationales for divestiture.

Data methodology and hypothesis testing

Data Description

Firms with stock return data available on the CRSP tape, which announce the intent and then do divest a unit during the years 1970 to 1982 are identified from the Wall Street Journal Index.¹⁰ For spin-off sample firms, these dates are verified in the Capital Changes Reporter. Since identification of the precise event date is important, the years before the announcement are examined to be certain that there are no earlier public announcements of the intended divestment. The one-year period following the actual completion of the divestiture and the interim period between the announcement and the divestment are also examined to eliminate firms that seem to have other confounding events. However, it is generally true that all firms made other news announcements. Excluded from the sample are firms which divested a unit with no prior announcement of intention, and firms which announced the intent to divest but subsequently made no announcement of the actual divestiture. Further, the sale of a unit as a result of bankruptcy proceedings, the sale of interest, a product, or the entire firm are also excluded from the sample. The resultant sample of 133 single divestiture firms comprises 50 firms which announced and completed a divestment without specifying any motivation or intended impacts. Twenty-three firms

⁸See Linn and Rozeff (1984) for a discussion of negative synergies, termed anergies.

⁹See Egar (1983) and Agrawal and Mandelker (1987) for a discussion of stock return variance as a proxy for firm return variance.

¹⁰Center for Research in Security Prices, Chicago University.

Table 2
Summary of Stockholder Mean and Variance of Returns***

Sample	Number of firms	Pre-announcement ^a parameter	Announcement ^b parameter	Divestment ^c parameter	Post-divestment ^d parameter	Pre-announcement ^a to announcement ^b direction of shift	Number of firms increase	Pre-announcement ^a to post-divestment ^d direction of shift	Number of firms increase	Divestment ^c to post-divestment ^d direction of shift	Number of firms increase
Stockholder portfolio means											
No stated rationale	50	0.395	0.700	1.128	0.731	Increase (-0.326)	25	Increase (-1.175)	27	Decrease (-0.432)	22
Losing operations	23	-0.976	5.851	1.846	0.237	Increase* (-3.161)	17	Increase (-1.696)	15	Decrease (-0.658)	9
Agency	18	1.159	2.095	-0.226	1.236	Increase (-0.364)	10	Increase (-0.096)	9	Increase (0.574)	11
Spin-off	42	0.911	2.698	3.168	1.158	Increase (-0.828)	23	Increase (-0.538)	22	Decrease* (-2.034)	21
Stockholder portfolio variances											
No stated rationale	50	0.01056	0.01670	0.01360	0.01025	Increase (0.632)	21	Decrease (1.030)	26	Decrease (0.753)	34
Losing operations	23	0.05651	0.08428	0.07683	0.07359	Increase (0.670)	13	Increase** (1.302)	17	Decrease (0.957)	14
Agency	18	0.08198	0.07410	0.12800	0.07791	Decrease (1.106)	12	Decrease (1.052)	6	Decrease (0.605)	15
Spin-off	42	0.02311	0.05928	0.01113	0.03028	Increase (0.389)	19	Increase** (1.309)	24	Increase** (2.719)	22

*Statistically significant at $\alpha = 0.05$. The numbers in parentheses are t statistics.

**Statistically significant at $\alpha = 0.05$. The numbers in parentheses are F statistics.

***The numbers indicating mean and variance in this table have all been multiplied by 1000.

^aThe pre-announcement period is defined as AD-259 to AD-7 where AD is the announced date of intention to divest.

^bThe announcement period is defined as AD-6 to AD + 6 where AD is the announced date of intention to divest.

^cThe divestment period is defined as DD-6 to DD + 6 where DD is the divestment date.

^dThe post-divestment period is defined as DD + 7 to DD + 259 where DD is the divestment date.

stated that the divestment was the result of losing operations, or announced the divestment after a year or more of quarterly earnings reports which indicated large losses. Eighteen firms divested units to officers or managers of the corporation. Occasionally these divestments were accompanied by statements of improvements in managerial efficiency or differing managerial philosophies. These firms comprise the agency sample category. Finally, 42 firms chose a spin-off form of divestiture.¹¹ For a summary of the resultant categories see Table 2, column 2.¹²

¹¹Spin-off motivations may be comparable to those in sale divestments. However, spin-offs occur less frequently than sale divestments. Over the twelve-year period examined, only 42 single divestments of publicly traded US firms occurred as a spin-off. Further comparability with other divestiture research suggests categorising spin-offs separately.

¹²All of the resultant sample firms are US corporations. European firms are well represented in the universe of divesting companies, but sampling criteria (mentioned above), and data constraints reduced the sample.

As can be seen from the foregoing categorisation, three hypotheses cannot be directly tested. Only three firms made what could be termed 'good news' announcements. An example of such a good news announcement was that the unit was being sold for more than it was worth. Only one firm made a 'bad news' announcement. Finally, as would be expected, no firms announced a divestment aimed at transferring wealth from bondholders to stockholders.

It could be argued that the selection criteria used here results in an examination of atypical divestments. Many firms were excluded due to the presence of multiple divestments or because there was only a single press release. If this sample is biased, it is worthy of analysis in its own right. But sample bias seems unlikely since the resultant sample does appear to be comparable in industry composition and size of divestment to earlier reported empirical divestiture studies.¹³

¹³See Jain (1985) for a discussion of size as a factor in divestitures.

Methodology and Hypothesis Testing

To test the aforementioned hypotheses, the variances and means of the pre-announcement period returns are compared to those in the post-divestment and event periods. Stockholder return variance is used as a proxy for the variance of returns on the firm's assets. The pre-announcement comparison year is used as a standard against which post-divestment and event time impacts are measured.¹⁴ The use of a twelve month pre-announcement period helps to average out market fluctuations and the use of a twelve month post-divestment period captures any 'permanent changes' related to the divestiture. Announcement period impacts are measured during the six days on either side of the news release. Any effects resulting from the actual divestiture will be observed immediately at the divestment period, the six days on either side of the actual divestment date. Using six days before the event date (announcement or divestment) captures any return effects which occur as a result of market anticipation. And using six days after the event date captures any temporary and permanent return effects. In an efficient capital market, any effect of a pending divestment will occur at the announcement period with the impact of any resolution of uncertainty regarding the divestment occurring at the divestment period. 'Permanent changes' in the level of expected returns or variances will be reflected in the post-divestment period. A permanent change in mean return, if it occurs, might reasonably be interpreted as evidence of a shift in the firm's beta.¹⁵

Two formulations of statistical tests are employed to examine the impact of divestment. For individual firms, the average return and variance of return are examined during the aforementioned periods. In the second formulation, event time portfolios are constructed over the same time periods. The time series portfolio daily announcement period and comparison period means and

their respective sample variances are computed using daily portfolio returns. Event time cross-sectional comparisons are important because they are less sensitive to the impacts of other news announcements that might affect the return parameters of individual stocks. However, relying completely on cross-sectional portfolio returns can obscure important price impacts if they are opposite in sign.

Portfolio and individual firm calculations are made on both raw returns and on market adjusted returns. In this latter instance the daily return on an equally weighted market portfolio of New York Stock Exchange firms is subtracted from the daily return on the security.¹⁶ First, to determine whether divestiture results in significant changes, and in what direction, a statistical comparison is made between the variances of returns during the pre-announcement period and the post-divestment period using the standard F test. Then a second set of tests are performed to examine whether divestment results in a shift in the mean return to the securities under consideration. When it has been previously determined that the two samples have equal variances, the test statistic used is as follows:

$$t = \frac{(\bar{R}_{pa} - \bar{R}_{pc})}{\left[\frac{(n_a - 1)S_a^2 + (n_c - 1)S_c^2}{(n_a + n_c - 2)} \right]^{1/2} \left[\frac{1}{n_a} + \frac{1}{n_c} \right]^{1/2}}$$

where

\bar{R}_{pa} and \bar{R}_{pc} are the pre-announcement period and post-completion period mean daily portfolio (or individual firm) returns;

and

S_a^2 and S_c^2 are the respective sample variances (computed from the time series of portfolio daily returns for portfolio comparisons);

and

n_a and n_c are the pre-announcement and post-completion number of return observations.

When the two variances have been previously determined by the F test to be unequal, the test statistic is as follows:

$$t \sim Z = \frac{\bar{R}_{pa} - \bar{R}_{pc}}{\left(\frac{S_a^2}{n_a} + \frac{S_c^2}{n_c} \right)^{1/2}}$$

with

$$\left[\frac{\left(\frac{S_a^2}{n_a} + \frac{S_c^2}{n_c} \right)^2}{\left(\frac{S_a^2}{n_a} \right)^2 \left(\frac{1}{n_a + 1} \right) + \left(\frac{S_c^2}{n_c} \right)^2 \left(\frac{1}{n_c + 1} \right)} \right] - 2$$

¹⁴The pre-announcement and post-divestment period are chosen to be a year in length so as not to capture any market anomalies in examining the response of individual firms to divestment. Shortening these periods to six months did not alter the results. Event periods are defined as plus and minus six days from the event data. Other appropriate time periods were also examined, with no substantive differences in the results reported here. Further, the entire interim period between the announced and completed divestiture was also examined. In this later instance, as would be expected in an efficient capital market, no lagged divestiture announcement responses were evident.

¹⁵No adjustment is made for changes in the beta of firms. This is appropriate because research by Magiera and Grunewald (1978), Choi and Philippos (1982) and Klein (1985) find no statistically significant changes in beta resulting from corporate divestment. Further, if the firm's beta does change in response to divestment, the comparison period returns methodology will show the effect of the change by evidencing a shift in the mean returns to shareholders during the post-divestment period.

¹⁶The market adjustment procedure of subtracting the market return from that of the stock is supported by the work of Brown and Warner (1985) and more recently by Klein and Rosenfeld (1987).

Table 3
Summary of Market Adjusted Stockholder Mean and Variance of Returns***

Sample	Number of firms	Pre-announcement ^a parameter	Announcement ^b parameter	Divestment ^c parameter	Post-divestment ^d parameter	Pre-announcement ^a to announcement ^b direction of shift	Number of firms increase	Pre-announcement ^a to post-divestment ^d direction of shift	Number of firms increase	Divestment ^c to post-divestment ^d direction of shift	Number of firms increase
Stockholder portfolio means											
No stated rationale	50	0.147	-0.137	0.160	0.251	Decrease (0.338)	23	Increase (-0.400)	33	Increase (0.107)	25
Losing operations	23	-1.120	4.360	1.203	-1.528	Increase* (-2.664)	14	Decrease (0.587)	10	Decrease (-1.145)	12
Agency	18	0.514	1.358	-0.075	0.771	Increase (-0.342)	11	Increase (-0.333)	13	Increase (0.339)	8
Spin-off	42	0.694	2.582	3.079	0.807	Increase (-1.383)	26	Increase (-0.258)	26	Decrease (-1.551)	21
Stockholder portfolio variances											
No stated rationale	50	0.00853	0.01244	0.01585	0.00858	Increase (0.685)	23	Increase (1.005)	27	Decrease (0.541)	28
Losing operations	23	0.05160	0.07608	0.08108	0.07040	Increase (0.678)	15	Increase** (1.364)	17	Decrease (0.868)	13
Agency	18	0.07575	0.07694	0.12720	0.07514	Increase (0.984)	11	Decrease (1.008)	7	Decrease (0.590)	14
Spin-off	42	0.02140	0.06135	0.01639	0.02721	Increase (0.348)	19	Increase (1.271)	23	Increase (1.660)	20

*Statistically significant at $\alpha = 0.05$. The numbers in parentheses are t statistics.

**Statistically significant at $\alpha = 0.05$. The numbers in parentheses are F statistics.

***The numbers indicating mean and variance in this table have all been multiplied by 1000.

^aThe pre-announcement period is defined as AD-259 to AD-7 where AD is the announced date of intention to divest.

^bThe announcement period is defined as AD-6 to AD + 6 where AD is the announced date of intention to divest.

^cThe divestment period is defined as DD-6 to DD + 6 where DD is the divestment date.

^dThe post-divestment period is defined as DD + 7 to DD + 259 where DD is the divestment date.

degrees of freedom to the closest integer and the notation defined as above.

Similar tests are conducted on the event period parameters.

Empirical results

Tables 2 and 3 present a summary of portfolio and individual firm mean and variance return comparisons across the entire divestiture period for raw returns and market adjusted returns respectively. Individual company results are summarised in Tables 2 and 3. For brevity a complete tabular presentation of individual results by firms has been omitted. However, within each sample category the results of individual firms can be tested jointly using a binomial test.¹⁷ The results of such testing are not reported in the following sections since in all sub-samples the joint null hypothesis of no-effect on mean returns cannot be rejected. Results will be discussed by sample category first and then summarised.

No Stated Rationale Sample Results

For 17 out of 50 individual firms, and for the time series portfolio, the null hypothesis of equality of pre-announcement and post-divestment variances cannot be rejected. Post-divestment return

¹⁷The binomial test is designed to determine whether the true directional change of the parameter is random (i.e. 50% increase and 50% decrease). When the sample size is large ($npq > 3$) as in these categories, the normal approximation to the binomial can be used. Here the binomial probability equals:

$$Pr(z) \geq \frac{x - np}{\sqrt{np(1-p)}}$$

where

n = the number of 'trials' (firms in the sample)

x = the number of 'successes' (statistically significant return changes)

and

$$p = 0.5$$

$F(z)$, the cumulative normal distribution function, is insignificant in every sub-sample mean comparison.

variances are larger for 26 (27 for market adjusted) of the 50 sample companies and smaller for 24 of them. Further, individual company *t* statistics indicate that mean returns in the pre-announcement and post-divestment period for 46 companies are not statistically different from each other. However, the negative sign of the test statistic indicates that on average the mean return is slightly larger in the post-divestment period.

The results further indicate that numerically pre-announcement variances are greater than those for either the announcement period or the divestment period for 29 (23 for market adjusted) and 27 (28 for market adjusted) firms respectively. Mean return comparisons between these two periods for firms and for the portfolio yield *t* statistics that are insignificant, though the direction of the announcement period portfolio change is consistent with the post-divestment increase.

A comparison of pre-announcement and post-divestment variances to divestment period variances results in conclusions similar to the announcement period comparison. Post-divestment variances are not statistically larger than the divestment period, but for 34 (28 for market adjusted) firms they are numerically so. Again the change in mean returns for individual firms and for the portfolio is not statistically significant.

It appears, across the divestment time horizon for both market adjusted and raw returns, that individual firms have idiosyncratic and insignificant responses to divestiture news. When management offers no rationale for the divestiture, the impacts of the announcement and completion appear to be consistent with the no effect hypothesis. A discussion of the conclusions drawn from these results follows the presentation of the results for the remaining categories.

Losing Operations Sample Results

For 74% of the 23 firms that comprise the losing operations sample, post-divestment return variance is larger than the pre-announcement variance. And the announcement and divestment event period variances are also larger than the pre-announcement standard of comparison. Price increases during the announcement and the divestment period appear to be the cause of the increase in estimated variances. Seventeen of the 23 firms experience an increase at the announcement period for raw returns and 14 for market adjusted returns. On a portfolio basis this increase is statistically significant at $\alpha = 0.01$ ($t = -3.16$ and $t = -2.66$). The divestment period shows a similar increase, but the portfolio results are not statistically significant. As would be expected in an efficient capital market, the return effects which occur for this sub-sample are impounded very quickly at the announcement and divestment period. However, because of the difference in

results using raw or market adjusted returns, it is not clear whether, or in what direction, any 'permanent changes' result from divestitures in this subsample. Generally the post-divestment mean is larger than the pre-announcement mean and the increase is statistically significant on a portfolio basis at $\alpha = 0.10$ ($t = -1.696$) for raw returns, but reverses itself, and is insignificant, for market adjusted returns.

The impact on stock values according to economic theory in the losing operations hypothesis is ambiguous. But the results are consistent with what one would expect a rational, value-maximising management might hope to achieve—an increase in share value. However, the impact on stock variance, as a proxy for firm return variance, is in the opposite direction to what one would expect, according to this motivation for divestiture. Perhaps the increase in variance is unimportant because individual firm gross risk is diversifiable for most shareholders. Alternatively, perhaps the increased firm risk is less than it would have been in the absence of the divestment.

Agency Sample Results

In support of the agency hypothesis, 67% of the firms (61% for those market adjusted) which divested units to managers of the unit or officers of the corporation experienced a decrease in variance after the completion of the divestment. However, with one exception, there are no significant changes in mean returns to individual firms (or the time series portfolio). Generally, the announcement period is one of increased mean return. And the post-divestment period mean return is on average larger than the pre-announcement standard of comparison. But in neither case are these increases statistically significant.

Spin-off Sample Results

The variance of shareholder returns is smaller in the pre-announcement period as compared to the post-divestment period for a majority of the 42 firms in the spin-off sub-sample. This result also holds for the event time portfolio. Despite this shift in variance, there is no statistically significant post-divestment change in mean return. At the announcement period there is an increase, though not a significant increase in mean returns. However, at the divestment period, the increase in mean returns to shareholders is statistically significant at $\alpha = 0.05$ for raw returns and $\alpha = 0.10$ for market adjusted returns.

One of the problems with the above analysis is that it is incomplete. A spin-off creates a post-divestiture firm whose shareholders own less of the parent company than they owned prior to the divestiture with no concomitant inflow of receipts from divesting. Thus, the returns to the spin-off unit must also be examined to determine whether

shareholders are better or worse off than they were prior to the divestment. Unfortunately 64% of the sample spin-off units were never publicly traded. To circumvent the problem this creates for examining returns to stockholders of the spin-off unit, we can assume an efficient capital market. Then the returns and variances on days before the actual spin-off, but after its announcement, should reflect the effect of the spin-off.¹⁸ Using this technique, the hypothesis that the parent company has a variance less than or equal to that of the combination of the parent and the spin-off unit cannot be rejected at the 0.05 level. In addition, differences in mean returns in both samples are generally insignificant.¹⁹ See Table 4.

Results Summarised

One of the striking results that is apparent from this analysis is that the impact of divestment across categories varies. In the losing operations and spin-off sample categories, post-divestment return variances are larger than the pre-announcement variance for 74% and 57% of the respective samples. The reverse is true for the agency sample. Here 67% of the firms experience a variance decrease. However in the no-stated-rationale category, consistent with the no effect hypothesis, there is no discernible impact.

The mean return to individual shareholders of divesting firms often increases, but the increase is typically not statistically significant. On a portfolio basis, two sub-samples have statistically significant event period mean increases. At announcement, for the losing operations category, divestment has a positive impact on shareholder wealth. In this category, divestment appears to reverse the previously negative shareholder return. At divestment, the spin-off sub-sample experiences a statistically significant impact. One can speculate that this impact occurs at divestment rather than at announcement as one might otherwise expect because considerable uncertainty about the eventual spin-off may remain at the time of the announcement.²⁰

With one exception, the results for market-adjusted returns do not vary substantively from those for raw returns. For the losing operations sample, the post-divestment mean is greater than the pre-announcement mean for raw returns. When market adjusted returns are used, the direc-

tion of shift, though insignificant, is opposite. Thus it may be that divestments are no more likely to occur during bull or bear markets. Another plausible explanation for the lack of substantive difference between results using market adjusted and raw returns is that any bias from using mean or raw returns to detect abnormal performance is too small to be of significance in this sample. Both conclusions may be justified. From 1969 to 1982 the US experienced periods of both bull and bear markets and the sample of firms used here appears evenly distributed across this time horizon.²¹ Bull and bear market definitions are somewhat subjective but, by defining low values of the Standard and Poor 500 Index as the bottom of a bear market and high values as the top of a bull market, there are 88 months of bull market conditions and 56 months of bear market conditions in the 144 month sample time horizon. During the same period there were 81 divestitures in bull markets and 53 divestitures in bear markets. Thus it appears that the occurrence of a divestment is independent of market conditions.²²

Further, the results presented above appear consistent with *ex ante* predictions concerning managerial motivations. In the losing operations sample, on average, management is apparently able to achieve a positive shareholder impact by divesting the firm of some of its assets. The agency hypothesis predicts that high growth units will be sold to managers of those units and the reduced agency costs and problems will have a positive impact on shareholders. Post-divestment return variances are often smaller than the pre-announcement comparison period, and the direction of change of mean returns to shareholders is in support of the predictions of this hypothesis. In the no-stated-rationale category, the results indicate that means and variances are equal. Though there are no hypotheses in the literature of financial economics

²¹See *Business Conditions Digest*, 1987, US Department of Commerce Bureau of Economic Analysis.

²²The proportion of bull market conditions in the sample is 0.611, therefore 61.1% of the sample divestitures should occur during bull markets, if divestment is independent of market conditions. This hypothesis, $H_0: P_0 = 61.1\%$, can be tested statistically against the alternative, $H_0: P_0 \neq 61.1\%$:

$$Z_{OBS} = \frac{\hat{P} - P_0}{\sqrt{\frac{P_0(1 - P_0)}{n}}}$$

where

\hat{P} = the observed proportion of sample firms.

P_0 = the proportion equal to the market condition proportion,

n = the number of sample firms,

and

z = the normal distribution test statistic.

Since the $Z_{OBS} = 0.23$ the null hypothesis cannot be rejected and the appearance of independence between market conditions and divestiture observations is reinforced for this sample.

¹⁸The pre-divestment period does not start earlier than six days after the spin-off announcement. The average time between a spin-off announcement and the actual spin-off was four and a half months. The shortest interim period was nine days and the longest over a year.

¹⁹A second test was performed for the small sample of spun-off units which were publicly traded with similar results.

²⁰For instance, many firms announced an intended spin-off that never occurred, while others occurred only after more than a year. Further, typically the tax status of the spin-off is not known at the announcement date.

Table 4
Parameter comparison of parent and divested unit for the spin-off 42 firms

Name	Pre-announcement variance ^a	Pre-divestment variance ^b	Pre-announcement mean ^a	Pre-divestment mean ^b	F	t
Aegis Corp.	0.00874059	0.01156714	0.00733474	-0.00217651	0.77564020	0.35514234
Alaska Air	0.00097729	0.00084614	0.00032615	0.00773946	1.15499740	-0.83648078
Amax Inc.	0.00049573	0.00031837	0.00080711	-0.00468523	1.55714444	0.07458701
American A.	0.00201658	0.00088454	0.00635759	0.01415276	2.27980536	0.61836030
American N.	0.00026031	0.00036685	0.00038151	0.00540376	0.70958613	-1.08466680
Archer Dan.	0.00034784	0.00068924	0.00008930	-0.00174569	0.50469966	0.23928869
Benquet Co.	0.00193836	0.00373719	0.00080550	0.00900707	0.51866703	-0.47742689
Browning F.	0.00182900	0.00095953	-0.00169355	-0.00841823	1.90614051	0.55901360
Cellu Craf.	0.00211540	0.00119645	0.00269447	-0.00869153	1.76806339	0.87926947
Centronics	0.00096908	0.00106192	0.00138090	0.00669546	0.91257346	-0.59907339
Charter Co.	0.00117074	0.00346023	0.00236614	0.01311646	0.33834354	-0.65329976
Coastal Co.	0.00218791	0.00051925	0.00040297	0.00605938	4.21352345*	-0.81174350
Coca Cola	0.00053679	0.00092316	0.00000351	-0.00362753	0.58146749	0.54237200
Deseret Ph.	0.00075633	0.00035903	0.00255586	0.00898446	2.10655956	-0.83199273
Easco Corp.	0.00064978	0.00037919	0.00014355	0.00679953	1.71359126	-0.92703334
Eversharp	0.00110919	0.00075969	0.00123396	-0.00038161	1.46006094	0.17182211
Gearhart I.	0.00051010	0.00048057	0.00224604	0.00552553	1.06145789	-0.51130387
Hasbro Ind.	0.00221715	0.00232245	0.00036129	0.00338138	0.95465849	-0.22531381
Howmet Cor.	0.00051259	0.00231808	-0.00167072	0.00255530	0.22112936	-0.31469892
I.U. Intl C.	0.00042860	0.00060066	0.00097781	-0.01169230	0.71354844	2.13292187*
Koger Pty.	0.00030567	0.00046152	0.00085873	0.01169053	0.66231330	-2.15401272*
MGM Grand	0.00082664	0.00065585	0.00014853	-0.00057292	1.26041330	0.08865972
McDermott	0.00070211	0.00125545	-0.00301312	0.01869269	0.55925098	1.57317847
Midwestern	0.00065317	0.00011363	-0.00138134	0.00170946	5.74824805*	-0.91895735
Nestle Le.	0.00133237	0.00509611	-0.00034415	-0.01533676	0.26144946	0.75221692
Oxford Ind.	0.00034667	0.00004926	0.00125875	0.00887100	7.03665074*	-3.35303238*
Pennzoil C.	0.00066847	0.00048114	0.00073726	-0.00616961	1.38934092	0.94546494
Philadelphia	0.00051338	0.00040772	0.00195937	0.00307818	1.25916176	-0.17449321
Pier 1 Imports	0.00058730	0.00128357	-0.00188339	-0.02164348	0.45755492	1.96576772*
Reliance G.	0.00036170	0.00015503	0.00148287	-0.00749007	2.33312213*	2.45586158*
Rossmoor C.	0.00114144	0.00144167	0.00276025	-0.00818315	0.79174636	1.13236692
Seaco Inc.	0.00087329	0.00163644	0.00014115	0.02964653	0.53365371	-2.59460632*
Southdown	0.00180170	0.00070385	0.00060440	-0.00303350	2.55989030*	0.46489104
Sperry & H.	0.00028435	0.00064865	0.00044994	0.01628353	0.43837928	-2.21680615*
Systems Pl.	0.00174837	0.00283933	-0.00028990	0.01947861	0.61577176	-1.63960279
Tandy Corp.	0.00131048	0.00031022	0.00109938	-0.00047161	4.22429348*	0.29161260
Tandycraft	0.00011161	0.00090286	0.00118826	-0.00338392	0.12362041	0.54690922
Trans World	0.00095776	0.00014826	0.00250061	0.00135146	6.45994510*	0.29499030
Tyler Corp.	0.00046812	0.00009606	0.00167132	0.00019930	4.87314118*	0.48447941
Valmac Inc.	0.00054351	0.00612820	0.00047587	0.05699092	0.08869159	-2.59708325*
Warner Lam.	0.00019037	0.00015197	0.00082278	-0.00407953	1.25272699	1.25521406
Woods Corp.	0.00125292	0.00048861	-0.00006535	-0.00784415	2.56425892*	1.19295888

^aThe pre-announcement period is defined as AD-259 to AD-7, where AD is the announced date of intention to divest.

^bThe pre-divestment period is defined as DD-13 to DD-1, where DD is the divestment date.

*F is significant at the 0.05 level (The critical F = 2.32).

**t is significant at the 0.05 level (The critical t = ± 1.96).

that specifically pertain only to spin-offs, one might speculate that spin-offs are aimed at attempting to distribute high growth units to shareholders in order to prevent bondholders from sharing the wealth. The economically significant increase in divestment period mean return is consistent with this notion.²³

²³Unfortunately the sample presented here did not have enough publicly traded bonds to explore this hypothesis further.

Conclusions

Several conclusions can be drawn from the results presented here. First, regardless of whether raw returns or market adjusted returns are used to examine divestiture impacts, the conclusions are similar. This, and the distribution of the sample across the study time horizon, suggests that divestments are no more likely to occur during bull or bear markets. Second, firms seem to have idiosyncratic responses to divestment. But when

firms are categorised according to managerial motivations for divestment, the firm responses within categories are similar.

The analyses of firms which have a single major divestment leads to the conclusion that this activity is frequently associated with a change in return volatility, but only infrequently associated with a statistically significant change in mean return. There are, however, on average, two exceptions. The losing operations portfolio experiences a statistically significant increase in return at the announcement period. And for the portfolio of spin-off firms, the mean returns to stockholders during the divestment period is larger than that in either the pre-announcement or the post-divestment period.

The changes in return volatility, as a proxy for changes in the variance of returns on the firm's assets, also indicate that divestiture impacts vary with categorisation of the sample. Agency sample firms generally show a post-divestment variance decrease, while the losing operations and spin-off categories generally evidence a post-divestment variance increase.

The results presented here indicate that the parameter changes associated with divestiture vary depending on the motivation for divestment. Categories appear quite different from one another in mean returns and variances. When firms are categorised for examination according to managerial motivations for divestment, it appears that management is able to achieve the intended effect by divesting the firm of some of its assets. This conclusion is somewhat puzzling only in the no-stated-rationale category, where one wonders why management would expend its resources to divest a unit with no intention of a positive impact on shareholders. Perhaps in these instances managerial motivations are complex and can best be explained by a combination of the hypotheses presented in Table 1.

Future research might examine this issue more closely. Additional issues for future research might question whether this US divestiture sample is systematically different from divestitures in other countries. Further, another approach to the examination of divestiture impacts and motivations might prove fruitful. Specifically, return parameter changes to stockholders and bondholders could be used to discriminate more fully among hypotheses.

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THE ACCOUNTING HISTORIANS JOURNAL

Semiannual Publication of The Academy of Accounting Historians

Volume 15, Number 1

Spring 1988

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The Court's Power of Discretionary Relief in Actions Against Auditors

David Gwilliam*

Abstract—Since 1929, successive Companies Acts have empowered the courts to relieve a company auditor, wholly or partly, from liability for negligence having regard to all the circumstances of the case and if the auditor has acted 'honestly and reasonably'. This power is now contained within section 727 of the Companies Act 1985. By reference to decided cases in the UK and in those Commonwealth countries where similar legislation exists this article reviews the manner in which the courts have interpreted this section and explores the reasons why they have rarely, if ever, chosen to use their powers under this section in favour of auditors.

Section 727 of the Companies Act 1985 provides that:

If in any proceedings for negligence, default, breach of duty or breach of trust against an officer of a company or a person employed by a company as auditor (whether he is or is not an officer of the company) it appears to the court hearing the case that that officer or person is or may be liable in respect of the negligence, default, breach of duty or breach of trust, but that he has acted honestly and reasonably, and that having regard to all the circumstances of the case (including those connected with his appointment) he ought fairly to be excused for the negligence, default, breach of duty or breach of trust that court may relieve him, either wholly or partly, from his liability on such terms as it thinks fit.

The section is wide ranging in its scope and gives the courts extensive powers of discretionary relief. In fact, on few, if any, occasions have the courts chosen to use these powers to the benefit of auditors. This article looks at the way in which the courts have interpreted the meaning and application of this section¹ and investigates whether circumstances do exist in which the section might be applied to the advantage of defendant auditors.

This power of discretionary relief was first introduced into company legislation in s.279 of the 1908 Companies Consolidation Act. Similar clauses had earlier been included in the trustee legislation

enacted toward the end of the nineteenth century. However, s.279 only referred to the directors of the company and therefore did not include auditors either specifically or in their role as officers of the company. It was not until s.372 of the 1929 Companies Act that the section was extended to include auditors within the category of parties who might obtain relief.

Before 1929 there was no statutory restriction on an auditor's ability to contract out of liability for negligence either by means of a specific exclusion clause or through the operation of clauses in the Articles of Association of the client company indemnifying officers, including auditors, against liability for negligence. It was the existence of such a clause indemnifying the officers for negligence other than wilful negligence which relieved the auditor of liability for negligence in the *City Equitable*² case. Less common, but not unknown, were clauses indemnifying officers against any negligence short of actual dishonesty (as in *Brazilian Rubber Plantations*).³ Because s.152 of the 1929 Act (the forerunner of s.310, CA 1985) effectively removed the possibility of protection for auditors under contract⁴ it was no doubt considered equitable to bring auditors within the scope of the discretionary relief available to other company officers.

Despite the length of time for which relief has been available both in the UK (where it applies to officers of building societies as well as company officers) and also in Australia (presently as s.535 of the Companies Act 1981) and New Zealand (presently as s.468 of the Companies Act 1955) it has

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¹Here the focus is on 'negligence' rather than 'default, breach of duty or breach of trust'. The great majority of actions against auditors relate to alleged negligence in the performance of their statutory audit duties. While the auditor may commit non-negligent breaches of duty, e.g. breach of a duty of confidentiality owed to the client, there is little if any precedent as to the application of s.727 in such circumstances.

²*In re City Equitable Fire Insurance Company, Limited* [1925] Ch. 407.

³*In re Brazilian Rubber Plantations and Estates, Limited* [1911] 1 Ch. 425.

⁴For further discussion of the operation of s.310 C.A. 1985 as it applies to auditors see Gwilliam (1988).

attracted relatively little reported case law. In *Dimond Manufacturing*,⁵ heard before the New Zealand Court of Appeal, McCarthy J. referred to this absence of precedent in the following terms: 'The section is a common one . . . But there is little informative authority as to its scope' (p. 629). Furthermore, the authority that does exist primarily concerns actions involving directors and trustees rather than auditors. Nevertheless, a number of insights into the application of the section may be obtained from consideration of these cases. Here they are reviewed under the following headings: the circumstances of the appointment; the limitation of an auditor's vicarious liability for the actions of his partners or employees; relief from third party actions; activities of the auditor after the breach of duty.

Circumstances of appointment

Is there a distinction between the position of an honorary auditor and that of one carrying out his duties for reward? The application of the trustee legislation would appear to suggest that there is. In *National Trustees Co. of Australasia*⁶ the Privy Council indicated that it would consider less favourably an application for relief from a paid trustee than one from a trustee acting gratuitously. In *Windsor Steam Coal Co.*⁷ this was applied by Lawrence L. J. in the Court of Appeal. He stated:

The appellant . . . is a chartered accountant carrying on business for his own profit; and in the course of such business and as part of it he undertakes to act as the liquidator of the company at a remuneration. If in so acting he incurs a loss by acting wrongly, although he may have acted honestly, I have come to the conclusion on the authority of the case I have cited that the Court would decline to hold either that he had acted reasonably or that he ought fairly to be excused for the breach of trust. (p. 165)

The courts will not normally take into account the remuneration of an auditor in determining whether he has exercised reasonable care and skill in the performance of his duties. This was clearly stated by Lord Alverstone C. J. when he directed a special jury in *London Oil Storage*⁸ in the following terms:

Now, there are two or three matters which I think you should dismiss from your minds

⁵*Dimond Manufacturing Company Limited and Others v. Hamilton and Others* [1969] NZLR 609.

⁶*National Trustees Company of Australasia, Limited v. General Finance Company of Australasia, Limited* [1905] A.C. 373.

⁷*In re Windsor Steam Coal Company* (1901), Limited [1929] 1 Ch. 151.

⁸*The London Oil Storage Company, Limited v Seear Hasluck and Company* [1904] 31 Acct. L.R. 1.

altogether. You have not to consider for a moment whether Mr Hasluck has been sufficiently remunerated or not . . . He has accepted the position and duties of an auditor, and you have not to consider, aye or no, if he has had a sufficient amount.

However, while the level of remuneration may be irrelevant to determining whether there has been negligence it does seem that it may have a role in determining whether relief should be given against any or all of the responsibility for the consequences of that negligence.

Vicarious liability

Can s.727 be interpreted so as to reduce the liability of auditors either for work negligently carried out by their employees or for the negligence of other partners within an auditing firm? Such an interpretation would be attractive to auditors who, through their vicarious liability for the negligence of employees or fellow partners, may find themselves responsible for financial loss although they have not themselves been negligent.

Some support for the use of s.727 to restrict an auditor's vicarious liability might be inferred from the approval given by Stephenson L. J. in the Court of Appeal (in *Customs and Excise v Hedon Alpha*)⁹ to lower court submissions on the applicability of s.727, submissions which included the following:

the proceedings in which relief could be granted must be proceedings for the negligence, default, etc. of the director (or auditor) himself in his capacity as director (or auditor—or perhaps as one partner in a firm of accountants acting as auditors for the negligence, default, etc. of another partner). (p 823)

Whether Stephenson L. J. was supporting any limitation on a partner's vicarious liability for the acts of his fellow partners is unclear (his fellow Court of Appeal judges did not discuss the issue). It seems likely that to place such a construction on the meaning of the section would represent too great a departure from the normally accepted principles of vicarious liability for it to be sustainable other than in wholly exceptional circumstances. This was the view of Turner J. in *Dimond*. He stated:

The claim which for myself I would uphold as against the partners was made against them in respect of their vicarious responsibility as partners, for an act of negligence done by Mr. Meek; and if as I have held the defence is not available to him, it cannot shield them for their vicarious

⁹*Customs and Excise Commissioners v. Hedon Alpha Ltd. and Others* [1981] 1 Q.B. 818.

responsibility, springing from their relationship with him as his partners, for his act. (p 640)

Similarly in *Pacific Acceptance*¹⁰ Moffitt J. rejected the argument in respect of negligent acts of employees. He stated:

It would be difficult to conclude that an auditor for reward who has his work done through an employee should be excused under the section because the negligent act was one for which he was only vicariously liable. (p. 117)

Third party claims

The wording of s.727 would suggest that it might apply to a very wide range of potential claims. In fact the courts have chosen to interpret the section in a restrictive manner and have, in particular, been reluctant to consider its application in actions brought by third parties. In *Dimond*, all three Court of Appeal judges expressed reservations as to the applicability of the section beyond those actions brought by a client company or its shareholders. McCarthy J. stated:

However, I have very grave doubts whether the section in our Companies Act was intended to operate in respect of claims outside those brought by the company concerned, its shareholders or by some person in whose favour a duty has been created by the legislation. (p. 630)

North P. was even more emphatic:

In my opinion, in an action brought by a member of the public against an officer of the company or an auditor for a negligent misrepresentation the section affords no defence. (p. 645)

In the English courts a similar view was taken by all three Court of Appeal judges in *Customs and Excise v Hedon Alpha*. In the words of Stephenson L. J.:

I would ... hold that section 448 [the equivalent section to s.727 in the 1948 Act] ... is inapplicable to any claim by third parties to enforce any liability except a director's liability to his company or his director's duties under the Companies Acts. Wide and general though the opening words of section 448 are, read in their context they do not allow an officer or auditor of a company to claim relief in 'any' legal proceedings which may be brought against him in his capacity as an officer or auditor of a company by the rest of the world. (p. 824)

Actions subsequent to the breach of duty

In *Pacific Acceptance*, Moffitt J. raised the interesting question of whether the actions of the defendant after any breach of duty were relevant circumstances within the meaning of the section (in this case s.365 of the New South Wales Companies Act 1961). He noted:

The court may well take the attitude that the circumstances of the case are such that the defendants should not be excused on the basis that the court is inclined to the view that in relation to the later conduct of the defendants they did not act reasonably. (p. 119)

For Moffitt J. an important aspect of such conduct was the manner in which the defendants contested the case. He stated: 'It would be surprising if a person entitled to apply under s.365, having found he had made some mistake which was in breach of his duty, could not confess it at the first available opportunity and come to the court to be excused, offering so far as he could to repair matters and to pay the costs of the proceedings. (p. 119)

In this respect he considered that the defendants had acted unreasonably:

In the result the defendants declined to admit many matters which it later appeared were not in issue, and contested many matters which were incontestable ... The defence erected an enormous edifice which did not portray the true position but was a reconstruction, to say the least, founded upon an approach to the facts biased by interest ... The defendants' case, both at the interlocutory and hearing stages, was conducted with the fullest permissible exploitation of the adversary system. (p. 120)

It may be that Moffitt J.'s approach (which seems to contain a distinct element of plea bargaining) may have an increasing appeal to a judiciary frustrated and irritated by the ever increasing complexity, length and cost of civil actions involving auditing firms.

Conclusions

The principal obstacle to the success of any application for relief under s.727 is that it is difficult to see how it can be reasonable to be negligent—particularly when the underlying test for the non-negligent performance of an auditor's duties is that they are carried out with the exercise of reasonable care and skill. Can it be reasonable to be unreasonable? North P. referred to this problem in *Dimond* stating:

To begin with it is difficult to understand how a negligent officer or auditor could neverthe-

¹⁰*Pacific Acceptance Corporation Ltd. v. Forsyth and Others* [1970] 92 W.N. N.S.W. 29.

less be held to have acted 'reasonably' but there it is, for the section undoubtedly recognises that in some circumstances an auditor or other officer of the company, though guilty of negligence, may be held nevertheless to have acted reasonably. (p. 645)

More recently in *W. A. Chip*,¹¹ a case heard in the Supreme Court of Western Australia, a similar judicial view was expressed. While Pidgeon J. was satisfied that the defendant auditor had acted honestly he thought that any finding that the auditor had acted reasonably was 'to an extent' excluded by the finding of negligence against the auditor.

In *Duomatic*¹² Buckley J. threw some light on the interpretation of reasonableness for the purposes of s.727 when, referring to the actions of a director who failed to obtain legal and professional advice as to the advisability of an ex gratia severance payment to another director, he stated:

I do not think he was acting in the way in which a man of affairs dealing with his own affairs with reasonable care and circumspection could reasonably be expected to act in such a case. (p. 171)

In other cases involving directors where the courts have managed to discern 'reasonable negligence', the facts have usually related to technicalities in respect to the appointment and powers of directors. For example in *Claridge's Patent Asphalte Co.*,¹³ Astbury J. granted relief from personal liability for actions technically ultra vires. He stated that:

This transaction, if one can differentiate one breach of trust from another, was as little harmful or improper as one can very well imagine. (p. 549)

In *Barry & Staines Linoleum*,¹⁴ Maugham J. found that:

In the present case the petitioner has in my opinion acted honestly and reasonably, notwithstanding that there was a certain negligence in his not ascertaining that the articles of association required him to obtain his qualification of five hundred ordinary shares within two months after his appointment as a director. The circumstances set out in the petition show that the negligence was not of a very serious character. (p. 233)¹⁵

Although directors may be forgiven for overlooking technicalities, it is more difficult to envisage circumstances in which a professional auditor hired for his particular skill and expertise could avail himself of such a defence. In *Pacific Acceptance*, the defence sought to argue that relief should be available in the context of a negligently mistaken judgement. This did not satisfy Moffitt J. who stated:

The defendants contended that even though negligence was found, this negligence occurred at most in connection with a considered but mistaken judgement and that even if such a judgement was negligent and erroneous, it was minor, understandable and excusable. I reject this contention . . . I find that the audit clerks in no real sense ever applied their minds so as to come to considered judgements as to what as auditors they were really seeking to do in the vouching of secured loans. (p. 117)

Here again, while a mistaken judgement is not necessarily in itself negligent, if an auditor has not exercised reasonable care and skill in making that judgement it is unlikely that the courts would find grounds to excuse the auditor under s.727.

Reference

Gwilliam, D. R. (1988) 'Auditors: Exclusion Clauses, Indemnities and Disclaimers', *Professional Negligence*, Jan/Feb, pp. 8-11.

¹¹*W.A. Chip & Pulp Co. Pty. Ltd. v. Arthur Young & Co.* [1987] 5 A.C.L.C. 1,002, at 1,019.

¹²*Re Duomatic, Ltd* [1969] 1 All E.R. 161.

¹³*In re Claridge's Patent Asphalte Company, Limited* [1921] 1 Ch. 543.

¹⁴*In re Barry and Staines Linoleum, Limited* [1934] 1 Ch.227.

¹⁵*In re Gilt Edge Safety Glass, Limited* [1940] 1 Ch.495 is another case in which directors obtained relief from the penalties for unwittingly infringing company law.

The Non-submission of Accounts and Small Company Financial Failure Prediction

Kevin Keasey and Robert Watson*

Abstract—Information concerning past delays in submitting financial statements to Companies House has been found to be an important variable in predicting small company financial failure. However, a distinctive feature of the small company reporting environment is that a large proportion of small companies approaching financial failure fail to submit any accounts in the year(s) immediately prior to failure.

This paper presents evidence suggesting that non-submission information can usefully be incorporated into a failure prediction model along with information concerning finite delays in reporting and conventional financial ratios.

Introduction

Studies by Lawrence (1983) and Whittred and Zimmer (1984) concerned with the reporting behaviour of large companies found that those experiencing financial distress take significantly longer than financially healthy companies to publish their annual accounts. This differential reporting behaviour may be viewed as an 'extreme' illustration of the well-documented finding (Ball and Foster, 1982; Courtis, 1976; Givoly and Palmon, 1982; Patell and Wolfson, 1982) that 'bad news' generally takes longer to reach the market than 'good news'. The Whittred and Zimmer study considered the importance of reporting lags for the prediction of financial distress for a sample of companies listed on the Sydney Stock Exchange. They concluded (p. 295):

the inclusion of such information in conventional distress models does not result in any significant improvement in performance.

However, a study by Keasey and Watson (1987) found that, for small UK companies, past reporting lags were important predictors of failure.

The purpose of this paper is twofold: first, to consider some of the possible reasons for the apparent differences in results obtained by the Whittred and Zimmer and Keasey and Watson studies; and, second, to extend the work of both of these studies to incorporate information concerning infinite reporting lags (information on the non-submission of accounts) into a small company

failure prediction model.¹ We argue that, because of major differences in the reporting environment and behaviour of small companies, rules for dealing with the non-submission of accounts as well as information on finite reporting lags can usefully be incorporated into a failure prediction model for this sector of the economy.

Reporting environments and reporting behaviour

Whittred and Zimmer (1984) analysed the predictive ability of financial ratios and reporting lags up to five years before distress on a matched sample of 37 Sydney Stock Exchange listed firms over the period 1964 to 1978. Their finding no incremental information content in the reporting lags could be due to one or more of the following three factors:

- (i) the high accuracy of the financial ratio-based benchmark model;
- (ii) the reporting lag information being highly correlated with the ratio-based discriminant function;
- (iii) the lack of *substantial* differences in the reporting lags of companies in distress and companies not in distress.

For instance, if the financial ratio model gives very accurate predictions and this information is correlated with the lag information, then even very substantial differences in reporting lags will be unlikely significantly to improve upon the

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¹The definition of 'small' is that introduced by the UK 1981 Companies Act (though since somewhat increased). A company was small if it fulfilled two of the following three criteria: (a) turnover less than £1.4 million, (b) total historical cost balance sheet assets less than £0.7 million, and (c) less than 50 employees.

benchmark model's performance. In the Whittred and Zimmer study, the ratio only model had a relatively high level of predictive accuracy for all five years prior to distress. While the auditor's signature lag was significant up to four years prior to distress, the differences between reporting (total) lags for companies in distress and companies not in distress were statistically significant in only the final two years prior to distress. Thus, all of the above factors appear to be of some importance in explaining their results.

Nevertheless, these findings may not be relevant to the small company sector in the UK where, first, the 'diagnostic quality' of the financial information and, second, the reporting behaviour of companies may be radically different. First, small company failure prediction models based upon annual accounts generally produce less accurate predictions than similar models for large companies (Keasey and Watson, 1987). This is largely because of:

- (a) the inherent variability of small company performance over time (see Storey, *et al*, 1987);
- (b) the ability of the director/managers to manipulate and/or exclude transactions from the books (APC, 1979, 1980, 1983); and
- (c) the less stringent financial reporting requirements for small companies, particularly since the 1981 Companies Act regulations came into force.²

Second, the reporting behaviour of small companies may be different from that of large public companies because of possible differences in the reporting environments faced by the two types of company. The high public profile (visibility) of listed companies and the existence of several outside interest groups ensure that their financial statements are regularly scrutinised by outsiders (such as market analysts, Stock Exchange and government officials) to check compliance with Companies Act, professional accounting standards and other quasi-legal reporting requirements. In contrast, the legal reporting requirements of small companies are less comprehensive and have tended not to be rigorously enforced (see below). Moreover, the primary objective of much recent UK public policy towards the small firm sector has been to reduce the administrative and reporting 'burdens' on small companies (see Department of Trade and Industry, 1985a and 1985b).

An illustration of the lack of enforcement of reporting requirements for small companies may be found in an empirical study by Keasey and Watson (1986). This study, which was concerned

with inflation accounting and the prediction of small company performance, had its initial sample of 104 failed companies reduced to 40 for the one year prior model because of non-submission of the final set of accounts before failure. Even the three year prior failed sample was reduced to 76 companies for the same reason.³

If the above observations are typical, it would imply that a decision maker interested in predicting small company performance would have to find some means of dealing with the 25% to 60% of failing companies which had not submitted accounts within the three years prior to failure. It is because of this, that methods for dealing with the non-submission of accounts by small companies are considered in this paper.

The data and research method

The data used in this paper relate to single plant independently⁴ owned small companies in the North East of England for the period 1970 to 1982.⁵ Thus the companies to be considered here contrast markedly, in terms of failure rates, ownership, size, legal and financial reporting requirements, with those considered by Whittred and Zimmer. In particular, the failure rates of smaller enterprises are generally recognised to be much higher than those experienced by large listed companies (for example, see Foster, 1986, ch. 15).⁶ Indeed, UK estimates of failure rates (Ganguly, 1983) suggest that some 40% of new firms fail within two-and-a-half years of starting up and

³The sole sanction available to the Registrar of Companies to deal with companies which fail to produce the required documents is to strike the company from the register of companies. This rarely happens and then not before the company has failed to file accounts for several years. Even in the event of a company being struck off the register there are no legal impediments to the directors continuing to trade by forming a new company.

⁴For the present data set a company is defined as independent if both of the following conditions hold: (i) for any year of the annual accounts over the sample period, the company must be neither a lender nor borrower from an associated company, (ii) the company must neither own any shares in another company nor have any of its shares owned by another company.

⁵The sample used in this paper was also used in Keasey and Watson (1987). It is a sub-sample of a comprehensive employment and financial data set for small manufacturing firms in North-east England. The overall data set was jointly administered and collated by the Centres for Urban and Regional Development Studies and for Public and Industrial Economics, the University of Newcastle upon Tyne. A completely independent sub-sample from one considered here was used by Keasey and Watson (1986). That paper produced the discriminant function which provides the basis for evaluating the importance of lag information in the present paper. For a detailed discussion of the derivation of the discriminant function, see Keasey and Watson (1986).

⁶Precise rates of small company failure are, however, extremely difficult to measure due to lack of comprehensive data and because of temporal changes in the rates of new firm formation.

²The 1981 Companies Act allowed small companies (see note 1) to publish 'modified' accounts which consist solely of a highly aggregated balance sheet and notes.

that, overall, approximately 10% to 15% of the existing stock of small businesses can be expected to fail in any one year. Thus, given an investment horizon of five years, some 50% of small companies might be considered 'at risk'. For the purposes of this paper we considered a research design employing equal numbers of failed and non-failed companies to be reasonable.

A random sample of 73 failed companies and 73 non-failed companies was constructed. The failed and non-failed companies were not matched but, as can be seen from Table 1, statistical tests upon the resulting sub-samples indicates that they were not significantly different from one another in terms of age, industrial classification or asset size.⁷

The discriminant function used throughout this paper as the basis for evaluating the relative importance of lag information is a one-year-prior-to-failure discriminant function derived by Keasey and Watson (1986). An externally developed discriminant function has been chosen because the 'predictive success' obtained from the sample used to derive the discriminant function will be inflated due to statistical over-fitting. This one-year-prior discriminant function (which includes only two ratios, namely, debt/equity and disposable earnings/current liabilities) was derived from an initial set of 18 financial ratios using a stepwise reduction technique based upon Rao's V. The two-year and three-year prior functions of the earlier paper, while containing several additional ratios, did not result in materially different results for either the sample used in that paper or for the present sample.

In addition to the accounting information, the dates of each company's accounting year end, the dates that the accounts were received by Companies House and, for failed companies, the date on which the liquidator was appointed were also collected. In the few cases where the appointment date of the liquidator was not available, the date on which the company ceased to trade was used.

Small companies are notoriously slow in drawing up and filing accounts with the Registrar of Companies. For the present sample of 146 companies, the average reporting lag for the last three years of available accounts was slightly under one year (11.3 months). The respective three year average reporting lags for the failed and non-failed companies were 14.0 and 9.3 months respectively. This difference between means produced a separate variance *t*-statistic of 4.24 ($p < 0.01$). The reporting lags for each of the three individual years of available accounts showed similar and equally significant differences. However, these results are

less interesting than they at first appear because the lag distributions, particularly in respect of the failed sample, are significantly skewed to the right. Furthermore, as stated earlier, the last set of submitted accounts prior to failure were often several years out of date.

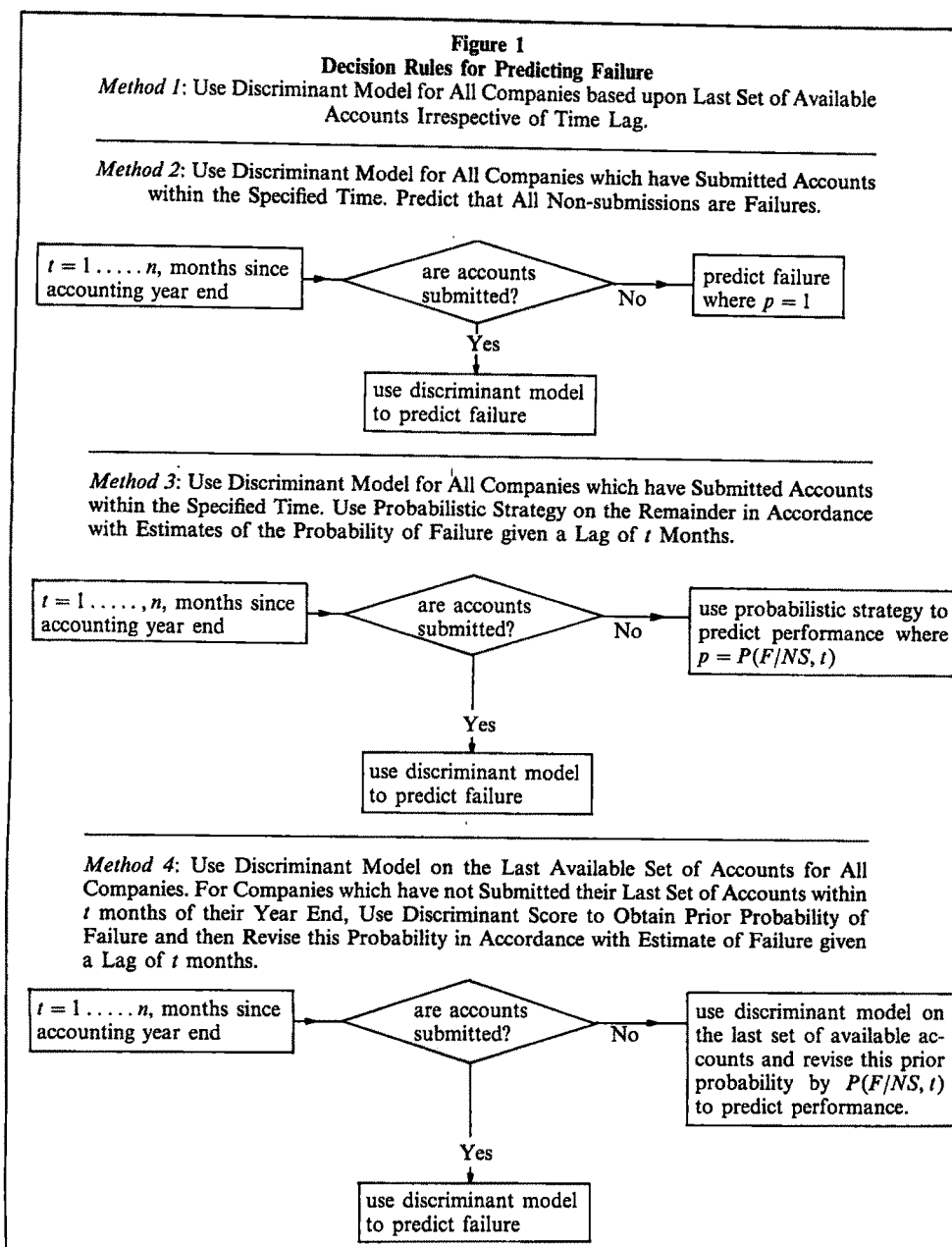
On the assumption that the accounting year end for companies which had not submitted accounts was 12 months after the accounting year end of their last published financial statements, some 47.9% of failed companies had not submitted their one-year-prior accounts by the date of failure. The last submitted accounts of 17.8% of the failed companies related to their performances and financial position two or more years prior to actual failure. The comparative figures for non-failed companies are 24.7% and 2.7% respectively (see Table 3). In fact, the chi-squared statistics reported in column 2 of Table 3 indicate that, apart from the shortest lag of six months, failed companies are significantly more likely not to have submitted accounts within a given time period than non-failed companies. Thus, the differential reporting behaviour that the research method described below is designed to address includes both finite reporting lags and infinite non-submission lags.

The simplest method of dealing with reporting lag information is to ignore it. That is, the performance of companies is predicted solely on the basis of the financial information available at the time the prediction is made. By adopting this strategy a prediction can be made for all companies of interest. The financial data on which the prediction is made will however be considerably out-of-date for those companies which have not submitted their most recent set(s) of accounts. This strategy forms the basis of our method 1.

A second method is to run an existing model only for those companies which have submitted their accounts within a specified period of their closing balance sheet date, say *t* months. To deal with the remaining companies (the non-submissions) the decision-maker may then apply to strategy which classifies all non-submissions as failures. This highly simplistic decision rule for dealing with the non-availability of accounts recognises the greater propensity of failing companies to delay/fail-to-submit their accounts. While being an obviously crude attempt at incorporating lag information, it may be adequate if the non-reporters are predominantly failing companies.

A third method to be considered is one where the decision maker has an estimate of the probability of failure given a reporting lag of, say, *t* months, and this probability is used to classify the non-reporters. Thus, in the absence of other information on which to base a decision, a 'probabilistic' strategy is used to classify the companies which have failed to submit their latest

⁷Unfortunately, comparisons of turnover could not be made because the majority of these companies are exempted from publishing this information.



set of financial statements by month t after their accounting year end.

The estimates of the probabilities of failure, given reporting lags of t months, are computed from the Bayesian rule:

$$P(F/NS) = \frac{P(NS/F) \cdot P(F)}{P(NS/F) \cdot P(F) + P(NS/NF) \cdot P(NF)} \quad (1)$$

where

F = Failed
NF = Non-Failed
NS = Non-Submitted Accounts
 $P(F) = P(NF) = 0.5$

To test method 3, the conditional probabilities $[P(NS/F) \text{ and } P(NS/NF)]$ derived from the present

sample have been used to approximate that of the population. The conditional probabilities relating to the various lags are shown in the third column of Table 3. For instance, given a lag of six months [i.e., $P(NS/F) = 0.726$ and $P(NS/NF) = 0.603$], and a prior probability of failure/non-failure of 0.5, equation (1) gives a conditional probability of 0.55.

One obvious criticism of method 3 is that it ignores all previous financial information concerning the companies which have not submitted their latest financial statements. The final method to be discussed here attempts to overcome this objection by incorporating the information contained in these previous statements. Method 4 uses a prior probability of failure based upon the discriminant

Table 2
Correct classification rate for method one

<i>Non-Failed</i>		<i>Failed</i>	
No.	%	No.	%
64	87.7	22	30.1
(58.9%)*			

*Overall correct classification percentage.

score for companies which have not submitted their latest set of accounts by month t . That is, $P(F)$ in equation (1) is no longer the sample prior probability of failure (0.5), but rather, the individual company's probability of failure derived from their last set of available accounts.

While methods 3 and 4 go some way to using a Bayesian approach for combining financial and lag information they are clearly not complete because once new financial statements become available the previous lag information is ignored. However, a complete Bayesian analysis would necessitate the 'tracking' of each individual company throughout its life in order to incorporate consistently the lag and financial information in each period. Only the decision rules associated with each of the above four methods are, therefore, considered in this paper. A representation of these decision rules is shown as Fig. 1.

To determine the stability of the predictive performance of the reporting/non-submission lags and to provide an indication of the optimum cut-off point, results will be presented for reporting/non-submission lags of 6 to 24 months inclusive in steps of 3 months.

The empirical results

Table 2 presents the correct classification results for method 1 which uses the discriminant model to classify all companies and which is based upon the last available set of accounts prior to failure. The overall correct classification rate is 58.9%. However, in interpreting these results one has to bear in mind that, because of non-submissions, the financial data used for classifying failed companies was often two or three years prior to actual failure.

Table 3 presents the correct classification results for methods two, three and four for a range of reporting/non-submission lags up to 24 months. As indicated in Fig. 1, method 2 involves predicting all non-submissions as failures. For example, the 18 non-failed and 35 failed companies which had not submitted within 12 months of the due date were all defined as failed companies. For those companies which had submitted accounts within 12 months of the due date, the discriminant model was used on their latest financial data. Column 4

of Table 3 indicates that the discriminant model successfully predicted 51 of the non-failed companies and 13 of the failed companies.

Thus, method 2's combination of discriminant analysis and the simple decision rule of classifying all companies which have not submitted their accounts within ' t ' months of their accounting year end as failures, was able correctly to predict 51 (69.9%) non-failed companies and 48 (65.8%) failed companies when a 12 month reporting lag was used.

A comparison of the results of methods 1 and 2 shows that method 2 produces markedly superior overall predictions once the reporting lag extends beyond six months. This method's superiority in correctly predicting failing companies is obvious for all lag periods (though the superiority decreases as the length of the reporting/non-submission lag increases beyond nine months) and hardly surprising given that most non-submissions are in fact failing companies and that the decision rule is to predict all non-submissions as failures. This same decision rule necessarily implies that all of the non-failing companies which have not submitted accounts are also classified as failures. However, this only adversely affects the predictive accuracy of method 2 vis-à-vis method 1 for the shortest lag periods when there are substantial numbers of non-failing companies which have yet to submit accounts. Which method is deemed most useful will clearly depend upon the loss function of the individual decision maker and the time period in which a decision is required. As we have no specific decision maker in mind, we are unable to specify the relative costs of type one and type two errors and therefore comparisons have to be made largely in terms of the overall correct classification rate.

Method 3 classifies companies which have not submitted accounts according to an estimate of the conditional probability of failure for each submission lag. Using the Bayesian formula described earlier, column 3 of Table 3 contains the conditional probabilities appropriate for the various lag lengths and a prior probability of failure of 0.5. For example, the conditional probability of failure if a company has not submitted accounts within 12 months of the due date is 0.66. Thus, using this probability, the decision maker can expect to obtain 66% (23) of the 35 failed companies which have not submitted accounts within 12 months of the due date correct and 34% (6) of the 18 non-failed companies which have not submitted accounts within 12 months of the due date correct. When these are added to the discriminant function's correct predictions of 51 non-failures and 13 failures for those companies which have submitted accounts within 12 months of the due date, the decision maker using method 3 will achieve an overall prediction success rate of 63.7% when using a 12 month reporting lag rule.

Table 3
Correct classification rates for methods 2, 3 and 4

Table 3																												
Correct classification rates for methods 2, 3 and 4																												
Lag- months	2				3				4				5				6				7							
	No. of non-submissions				χ^2	Conditional probability of failure given lag length of t months and prior probability of failure = 0.5				Correct predictions using discriminant model on accounts submitted within lag length t				Method 2				Method 3				Method 4						
	NF	%	F	No.		NF	%	F	No.	NF	%	F	No.	NF	%	F	No.	NF	%	F	No.	NF	%	F	No.	NF	%	
6	44	60.3	53	72.6	2.49	0.55	28	5	28	38.4	58	79.5	48	65.8	34	46.6	46	63.0	51	69.9	46	63.0	51	69.9	46	63.0	51	69.9
9	24	32.9	46	63.0	13.28	0.66	45	8	46	63.0	54	74.0	53	72.6	38	52.1	46	63.0	54	74.0	46	63.0	54	74.0	46	63.0	54	74.0
12	18	24.7	35	47.9	8.56	0.66	51	13	51	69.9	48	65.8	57	78.1	36	49.3	51	69.9	48	65.8	51	69.9	48	65.8	51	69.9	48	65.8
15	10	13.7	31	42.5	14.96	0.75	56	13	56	76.7	44	60.3	59	80.8	36	49.3	56	76.7	45	61.6	56	76.7	45	61.6	56	76.7	45	61.6
18	5	6.8	23	31.5	14.32	0.82	60	16	60	82.2	39	53.4	61	83.6	35	47.9	60	82.2	39	53.4	60	82.2	39	53.4	60	82.2	39	53.4
21	3	4.1	20	27.4	14.91	0.87	61	16	61	83.6	36	49.3	61	83.6	33	45.2	61	83.6	36	49.3	61	83.6	36	49.3	61	83.6	36	49.3
24	2	2.7	13	17.8	8.99	0.87	62	19	62	84.9	32	43.8	62	84.9	30	41.1	62	84.9	32	43.8	62	84.9	32	43.8	62	84.9	32	43.8

$P[\chi^2_1 > 3.84] = 0.05$.

$P[\chi^2_1 > 6.63] = 0.01$.

Figures in parenthesis indicate overall correct classification percentages.

$P[\chi^2 > 3.84] = 0.05$.

$P[\chi^2 > 6.63] = 0.01$.

Figures in parenthesis indicate overall correct classification percentages.

Comparing columns 5 and 6 of Table 3; method 3 is, in terms of overall correct classifications, slightly worse than method 2. However, for the shorter lag periods it is slightly better at predicting non-failing companies correctly. These overall results for method 3 may not, therefore, justify its increased sophistication vis-à-vis method 2.

Finally, method 4 works as follows. As for the other methods, if a company has submitted accounts within the designated lag period the discriminant function is used on the submitted accounts to predict the outcome of the company. If a company had not submitted timely accounts, then one should use the discriminant function on the most recently submitted accounts to obtain a prior probability of failure. This prior probability of failure is fed into the Bayesian formula with the prior probability of failure for the given reporting lag, to obtain a conditional probability of failure. This conditional probability of failure is compared to the critical cut-off probability of 0.5. A company is defined as a failure if the conditional probability is greater than or equal to 0.5 and as a non-failure if the probability is less than 0.5.

For example, using a 12-month lag rule, take a 'non-failed' company which has not submitted accounts within 12 months. Accordingly, apply the discriminant function to its most recently submitted accounts and imagine it receives a prior probability of failure of $P(F) = 0.4$. The other information needed to derive a conditional probability via the Bayesian formula is taken from column 2 of Table 3, $P(NS/F) = 0.479$ and $P(NS/NF) = 0.247$. Therefore, the conditional probability of the company failing is equal to

$$\frac{(0.479 * 0.4)}{(0.479 * 0.4) + (0.247 * 0.6)} = 0.56,$$

and therefore the company is defined as a failure. Comparing the results of methods 2 and 4, it is apparent that, apart from the initial period of up to six months, they are essentially identical. The reasons for this being that, as the lag increases, so does the probability of failure and this tends to 'swamp' the effects of the prior probability of failure obtained from the last set of available accounts. There seems to be little benefit, therefore, in using method 4, given its similar results and increased costs as compared to method 2.⁸

Conclusion

Whittred and Zimmer (1984) presented evidence which suggested that the inclusion of finite report-

ing lags in a discriminant model does not increase the ability to predict financial distress. However, the evidence in this paper suggests that their results cannot be applied to the small company sector in the UK where the populations of failed and non-failed companies have significantly differing propensities to submit accounts. Given that small companies have a high failure rate and a far higher propensity to delay/not submit their accounts, then the adoption of even a simple decision rule (such as that of Method 2) seems likely to improve materially the predictive accuracy of a failure prediction model. It also goes some way towards overcoming the problem of 'missing data' due to the late and/or non-submission of the accounts. The findings of the present paper suggest that, by combining lag and financial information, it should be possible to develop cost-effective monitoring procedures for small companies.

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⁸We are extremely grateful to an anonymous referee for making two points concerning this conclusion. First, the comparative prediction results of the proposed models are slightly sensitive to the prior probability of failure/non-failure. Second, this prior probability is itself dependent upon the length of the prediction horizon.

Journal of Business Finance & Accounting

Winter 1988

Editor: Richard Briston

Vol. 15 No. 4

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Some Implications of Auditor and Client Lobbying Activities: A Comparative Analysis

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Abstract—This paper examines the degree to which auditor and client lobbying is related in a UK context. This may help to identify any linkage between the wealth of clients and auditors that is affected by accounting standards, as propounded in the 'economic consequences' literature. It also might have some implications for the independence question. Three tests are conducted to see if auditors tend to support the lobbying position of the majority, or the most financially influential, of their clients. The third test is also used to identify any evidence that the comments of smaller clients tend to follow the lead of their audit firms/professional advisors. Auditor and corporate client written submissions on 22 proposed accounting standards are included in the study. The analyses are conducted both at an aggregated and also at a disaggregated level. The results do not indicate that auditor and client collusion took place. In particular, the results are consistent with the view that auditors are independent of their clients. Some suggestions are made for further research.

Introduction

A number of reasons have been postulated to explain why companies and auditors lobby accounting standard setting bodies following the publication of new proposals. Corporate management may lobby on proposed standards that have the potential to change accounting numbers that affect corporate contracts, such as borrowing restrictions in lending agreements and management compensation schemes geared to accounting profit numbers (see Watts and Zimmerman, 1986). Audit firms may lobby in favour of proposals that raise the price of their product (Puro, 1984, p. 625). It is probable that auditors would be against proposed standards that increase the complexity and costs of their work that could not be charged to their clients.

Auditors may lobby against the interests of some of their clients if that is believed to be in the best interests of the firm (Watts and Zimmerman, 1981; Johnson and Messier, 1982, pp. 204-205). For example, a company may be against a particular proposed accounting standard primarily because of the complexity of the proposals and the costs of implementation. However, the organisation's auditor may be in favour of the same proposed standard because it reduces an area of potential

disagreement and costly conflict with its client (see Nichols and Price, 1976, pp. 340-342). Further, the added complexity might result in increased audit work and in consequence enhanced fees.

In some cases, audit firms may be faced with clients with conflicting interests. Therefore, it is conceivable that auditors may tend to lobby in support of the position of major clients and thereby endeavour to protect significant audit fees over the long term. In particular, this might be the case when proposed changes to accounting numbers have the potential to affect corporate contracts that use such numbers, and thus have economic consequences for companies. Resultant wealth decreases or limitations to the growth of clients may correspondingly reduce or limit audit fees that tend to be largely a function of corporate size (Taylor and Baker, 1981; Taffler and Ramalingam, 1982; Firth, 1985).

This paper examines the degree to which auditor and client lobbying is related in a UK context. This may help to identify any linkage between the wealth of clients and auditors that is affected by accounting standards, as propounded in the 'economic consequences' literature (e.g., Watts and Zimmerman, 1981). It might also have some implications for the independence question (see US Senate Subcommittee on Reports, 1976, pp. 48-69; Haring, 1979; Puro, 1985; Wainwright, 1986).

The second section of this paper examines the relationship of auditors *vis-à-vis* their clients in the UK lobbying process in order to determine which party is more likely to be the dominant one. The third section develops the hypotheses being tested

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Table 1 Joint Auditor/Client Involvement in ED Comments

Ed No.	Description	Year Issued	References to Auditor	References to Client
1	Associated Companies	1970	1	4
2	Accounting Policies	1971	—	—
5	Extraordinary items & Prior Year Adjustments	1971	1	—
6	Stocks & WIP	1972	5	3
7	Extraordinary Items	1972	—	3
9	Industry Grants	1973	—	1
11	Deferred Tax	1973	1	5
14	Research and Development	1975	—	—
15	Depreciation	1975	—	—
16	Extraordinary items & Prior Year Adjustments	1975	—	—
17	Research and Development	1975	—	—
19	Deferred Tax	1977	—	2
20	Group Accounts	1977	—	1
21	Foreign Currency	1977	—	1
22	Post Balance Sheet Events	1978	—	—
23	Contingencies	1978	1	—
25	Associated Companies	1979	—	—
26	Property Depreciation	1980	—	2
27	Foreign Currency	1980	—	—
29	Leases and Hire Purchase	1981	—	—
30	Goodwill	1982	—	—
31	Acquisitions and Mergers	1982	—	—
Total			9	22

and describes the data collection procedures and the tests undertaken. The summary, conclusions and proposals for further research are presented in the fourth section.

The relationship of audit firms and clients in the lobbying process

In order to help determine a possible dominant lobbying party in a UK context, 676 corporate and 433 auditor written submissions (officially termed 'comments') on 22¹ accounting standard exposure drafts (EDs) issued between 1970 and 1982 were examined for any overt evidence of consultation between audit firms and their clients in formulating their respective submissions to the Accounting Standards Steering Committee (ASSC) and its successor, the Accounting Standards Committee (ASC). In a number of instances, companies referred to their auditors in ED 'comments' and similarly some audit firms mentioned client companies in their ED submissions. The number of times where auditor/client involvement in setting ED submissions was identified for particular EDs and, in total, is summarised in Table 1. The

numbers are shown for both company and audit firm comments. There were no such references in the comments on 11 of the 22 EDs.

There were only nine references to auditors in company comments. This represents 1.3 percent of the total number of 676 corporate submissions. Five of the nine references were included in the comments on ED6 (stocks and WIP) (ASSC, 1972a) and four of these were instances where auditors prepared the comments of plantation companies and the remaining one refers to an industrial company that submitted a joint lobby with its auditor. Only two of the remaining four companies specifically mentioned direct consultation with the auditors regarding the ED in question. The other two companies simply mentioned agreement with their respective auditors on some specific issue related to their lobby.

On the other hand, there were 22 audit firm references to client companies and this is 5.1 percent of the total number of 433 auditor comments. Of these, 13 mentioned consultations or discussions with clients or views received from clients and were the strongest indicator of auditor concern for the viewpoint of their clients. For example, one audit firm stated in its comments on ED 1 (associated companies) (ASSC, 1970a): 'We have received a number of observations both

¹The rationale for the selection of the 22 EDs is explained in the third section.

within this firm and from clients concerning the Exposure Draft and these are summarised below for the consideration of the Steering Committee' (ASSC, 1970b, ref. P. 17a). In addition, seven auditors identified specific problems that their clients would have in implementing specific proposals and the remaining two audit firms referred to clients in support of some point they were trying to emphasise.

There is thus limited evidence that some consultations between auditors and clients on EDs had taken place and that on balance the auditors appeared marginally to be more concerned to reflect the views of clients in their comments than *vice versa*.

An additional point evident from Table 1 is that the references taper off as time proceeds. There were eight company and 16 audit firm references in the four years from 1970 to 1973 inclusive, but only one and six, respectively, for the remaining nine years to 1982. Perhaps auditors in particular gradually became more sensitive to revealing any information that might be construed to suggest a lack of independence. An alternative interpretation might be that commentators on EDs became more self-confident once they were familiar with the ED system.

From the foregoing, it seems that some audit firms collated the views of both clients and partners and submitted the 'package' to the ASSC/ASC as their comments, at least in the early 1970s. Other firms of accountants discussed the economic and other implications to clients of various EDs before they submitted their lobby. There is a danger that auditors could innocently or deliberately have lobbied to protect the interests of the majority or most influential of their clients (and, indirectly, their audit fees). This could clash with their professional duty to protect the integrity of the financial accounts and to ensure that the 'best' accounting principles and methods are adopted. However, it is necessary to exercise caution in drawing any firm conclusions from such limited secondary evidence. The relatively infrequent references to auditors/clients may be isolated instances with little significance and in fact may represent necessary dialogue between the two parties on complex, technical accounting issues.

Hypotheses, data collection and tests

Proposed changes to accounting numbers have the potential to affect corporate contracts that use such numbers and to change the financial relationship and cash flows of contractual parties, such as lenders, shareholders and managers. Accounting profit and/or reserve numbers are used in some contract negotiations and subsequent monitoring. For example, interest cover and/or gearing numbers are often used in connection with borrow-

ing limits both in loan agreements and in articles of association.² Mandated changes to such numbers may adversely affect existing and future borrowing contracts. Accounting profit numbers may also be an important factor in trade union negotiations (see Maunders and Foley, 1974; Foley and Maunders, 1977). Accounting numbers also are used as a basis for cash and non-cash payouts (e.g., corporate taxation payments, dividend payments, and management compensation scheme remuneration geared to accounting profit).

For certain companies, the implementation of some ED proposals might result in permanent increases or decreases in reported accounting profits and/or reserves.³ For example, the first accounting standard proposal, ED 1 (associated companies) (ASSC, 1970a), proposed extending the coverage of consolidated accounts to include an appropriate share of the profits or losses and some balance sheet items of associated companies. This would tend to increase the consolidated profits and reserves of companies, assuming that associated companies were expected to be profitable over the long run. This was confirmed to be the case for all companies included in the research that lobbied on ED 1. The foreword to ED 6 (stocks and WIP) (ASSC, 1972a) indicated that the implementation of the ED proposals could alter the profit numbers in the financial accounts of some companies and change their taxation liabilities, unless there was some prior agreement with the Inland Revenue. Also, ED 11 (deferred taxation) (ASSC, 1973), ED 29 (leases and hire purchase contracts) (ASC, 1981), and ED 30 (goodwill) (ASC, 1982), each indicated the possibility that the implementation of their respective proposals might cause some companies either to be in default of loan agreement restrictions or at least to be nearer such an eventuality.

Proposed accounting standards might also increase or decrease the oscillations of reported profit numbers. For instance, several corporate commentators expressed such a concern over ED 5 (extraordinary items and prior year adjustments) (ASSC, 1971c). One of these companies complained that consolidated profit would be 'liable to *substantial annual fluctuations* according to the number and nature of extraordinary items' (ASSC,

²Companies that belong to the Federation of Stock Exchanges in Great Britain and have public (quoted) debt are subject to the condition that their articles of association limit the borrowing powers of directors to an 'ascertainable amount' (Pennington, 1973, p. 174). Typically, such clauses specify an overall borrowing limit based upon a definitive multiple of share capital and consolidated reserves.

³The implementation of certain provisions of ED 9 (the accounting treatment of grants under the Industry Act 1972), ED 29 (Accounting for Leases and HP Contracts), and ED 30 (Accounting for Goodwill), could directly increase or decrease the reserves of some companies (see Table 2).

Table 2 Major Criteria for Categorising ED Comments

ED No.	Description	Classification Criteria	
		Liberal Lobbyists	Conservative Lobbyists
1 & 25	Associated Companies	Support ED	Oppose ED
2	Accounting Policies	Oppose ED on liberal grounds	Support ED
5 & 7	Extraordinary Items & Prior Year Adjustments	Support ED	Oppose ED
6	Stocks & WIP	Support % of completion method Support more overhead in inventory	Support completed contract method Support less overhead in inventory
9	Industry Grants	Support credit of grant to P & L account	Support credit of grant to non-distributable reserve
11 & 19	Deferred Tax	Dilute comprehensive liability method Support deferral method	Support comprehensive liability method
14 & 17	Research & Development	Support capitalisation	Support write off in year
15	Depreciation	Oppose ED	Support ED
16	Extraordinary Items & Prior Year Adjustments (Supplement)	Oppose ED	Support ED
20	Group Accounts	Support more consolidation	Support less consolidation
21 & 27	Foreign Currency	Support temporal or average method	Support closing rate method
22	Post Balance Sheet Events	Support more gains in P & L account	Support less gains in P & L account
23	Contingencies	Support disclosure of more gains/less losses	Support disclosure of more losses/less gains
26	Property Depreciation	Against depreciation	For depreciation
29	Leases and Hire Purchase	Against lease capitalisation	For lease capitalisation
30	Goodwill	Support write off to reserves	Support amortisation through P&L account
31	Acquisitions & Mergers	Support merger accounting	Support acquisition accounting

1971d, ref. C5, emphasis added). Similar concern was expressed over ED 21 (foreign currency transactions) (ASC, 1977) because of its recommended treatment of exchange gains and losses when the 'temporal' method is used for the translation of foreign currencies. It was acknowledged in the subsequent ED 27 (foreign currency translations) (ASC, 1980, para. 110) that: 'The immediate recognition of exchange differences as part of operating profit causes reported profits to *fluctuate widely* and forces corporations to take *uneconomic* actions to avoid these effects' (emphases added).

Disclosure proposals contained in EDs might affect the level of reported profits, too, although this might be considered to be a more tenuous relationship than the others proposed above. For example, ED 2 (disclosure or accounting policies) (ASSC, 1971a) proposed that the prudence concept should take precedence over the accruals concept (see also Ashton, 1983, p. 33). One corporate commentator on this ED expressed the desire that the ultimate accounting standard would allow the inclusion of profit on uncompleted contracts in the

profit and loss account (ASSC, 1971b, ref. C2). Disclosure proposals also might reveal information that could affect the financial standing of companies. For instance, the standardisation of the disclosure of contingent gains or losses proposals in ED 23 (contingencies) (ASC, 1978) might enhance or impair the borrowing ability of some companies.

The first 31 EDs issued by the ASSC/ASC between 1970 and 1982 were examined in order to determine suitable criteria for analysing their potential impact on reported corporate profits and reserves, and on the disclosure of gains and losses. To varying degrees, 22 of these EDs were deemed suitable for analysis of corporate and auditor 'comments' in this way.

For the 22 EDs, the commentators were classified as 'liberal' (L) if they supported ED proposals that would *increase*: profit and reserves, profit variability, or the disclosure of gains, and as 'conservative' (C) if they supported ED proposals that would *decrease*: profit and reserves, profit variability, or *increase* the disclosure of losses.

Comments that did not fit into either category were classified as 'neutral' (N). The major criteria for categorising the selected EDs are outlined in Table 2.

The nine EDs excluded from the analysis, with reasons in parenthesis, were EDs: 3-acquisitions and mergers (withdrawn and ED comments not on public file);⁴ 4-earnings per share (no profit effect); 8-purchasing power of money (supplementary statements only and a departure from strict historical cost accounting); 10-value added tax (no profit effect); 13-source and application of funds (no profit effect); 12-imputation taxation (limited profit effect and non-controversial (Ashton, 1983, p. 62), with only 15 corporate comments); 18 and 24-current cost accounting (supplementary statements only and not historical cost based); and 28—Petroleum Revenue Tax (limited application). Berry *et al* (1985) discussed a survey that provided some evidence that most corporate loan decisions ignored CCA accounting numbers. This supports the decision to exclude EDs 18 and 24 from the research group.

Some EDs had greater potential impact on accounting numbers than others and, as might be intuitively expected, the comments for some EDs were easier to classify than others. For example, support for more overhead allocation to inventory than proposed in ED 6 (stock and WIP) (ASSC, 1972a) could be interpreted either as L or C depending upon volume changes. It was decided to categorise as C comments that supported less overhead in inventory primarily because the correspondents emphasised the need for 'conservative' or 'prudent' accounting (see ASSC, 1972b, ref. C6 and C7, respectively) and/or their other comments on ED 6 consistently were classified as C by the criteria (see Table 2). The L classification of comments that supported more overhead in inventory was confirmed in comparable ways.

Interpreting lobbies is not a straightforward and perfect procedure even for regulatory bodies (see Jain, 1979, pp. 13–14; Johnson and Messier, 1982, p. 206). The aim was to analyse the comments of as many EDs as was feasible so that any consistent client/auditor lobbying patterns over the 13 year time period on issues with economic implications would become apparent. This is a 'strategic' based research methodology (Buckley, 1976, pp. 44–45; Zmijewski and Hagerman, 1981; Amershi, *et al*, 1982). In any case, the criteria were uniformly applied to the comments of both auditors and corporate clients so that consistency was maintained.

Research Group

The research group included all companies that had submitted comments on at least two of the 22 EDs included in the research.⁵ This was to ensure that *all* frequent or at least recurring lobbyists were included who had thereby demonstrated concern over the consequences of several EDs. In general, it might be expected that more established lobbyists would tend to be more concerned than single and possibly more random commentators, that their views were supported in their auditor's comments. It was assumed that companies and auditors were indifferent in respect of EDs on which they did not submit comments.

In addition, single lobbyist companies were also included that had submitted comments either on ED6 (stocks and WIP) (ASSC, 1972a) or ED11 (deferred taxation) (ASSC, 1973).^{6,7} These two EDs were selected because, first, they had general applicability to most companies; second, they were among the more material ones in terms of profit impact; and, third, they induced a relatively high number of corporate and audit firm comments. The inclusion in the tests of the respondent companies to such generally applicable EDs might be considered to be adequate representatives of concerned *single* commentators. The combined total is a manageable 152 companies and is a significant proportion (53.5 percent) of the entire population of 284 companies.

It might be argued that the composition of the research group would tend to favour finding support for the research hypothesis that audit firm and corporate client lobbying is related. On the one hand, this has the disadvantage that positive results derived from the non-random data set cannot necessarily be generalised to the wider population of all auditor and corporate client lobbyists. On the other hand, this has the important advantage that negative results would tend to suggest more emphatically that such colluding did not exist. In any case, positive results employing any research design would require further validation studies, for which random samples could be obtained. In early studies of this type, negative results are in general more informative than positive ones (see Haring, 1979, pp. 510–511).

⁴Nationalised industry lobbyists were excluded from the research group. To augment the research group, six companies were included that submitted comments during 1980 on 'Accounting for Goodwill, a Discussion Paper' but not on the subsequent ED 30 (Accounting for Goodwill). All six companies were lobbyists on other EDs.

⁶EDs 6 and 11 were selected for tests involving comments on individual EDs. These tests are not reported in this paper.

⁷Special interest plantation and maturing industry companies were excluded from the ED 6 research group.

⁴An anonymous referee pointed out that the withdrawal of ED 3 could represent very effective lobbying! Of course, its inclusion in the research group was precluded because the comments were not on public record.

Tests

Three tests were made of the hypothesis that the comments of audit firms tended to support the lobbying position of the majority, or the most financially influential, of their clients. The first two tests compared the lobbying positions of auditors on EDs with the comments of their clients to see if they were significantly related using Chi-square One-Sample Tests. Of course, these analyses are based on the assumption that each client exerted equal influence upon its audit firm. It might be argued that auditors would be more concerned to lobby in support of lucrative clients that pay the highest audit fees.

A third test was therefore conducted to establish whether or not the comments of the audit firms in the research group tended to support the lobbying patterns of their above median fee clients. Of course, there is a further possibility that the comments of smaller fee paying clients and their auditors may tend to agree, too, but for fundamentally different reasons. Smaller clients may be inclined to rely on the professional advice of their auditors and to follow their lead in preparing formal corporate submissions on EDs. This latter hypothesis was also tested.

Initially, the three tests were conducted at an aggregated level that included all 22 EDs. In addition, separate disaggregated analyses were conducted on EDs that clearly fitted into one of the three main categories of potential impact—profit and reserves, profit variability, and the disclosure of gains and losses, in order to deal with any confounding effects on the results from combining EDs with different emphases (see Puro, 1984).

Auditor changes were taken into account although in general changes were infrequent during the years considered. Only 16 auditor changes were observed over the 13 year period 1970–1982, inclusive. In addition, a joint auditor was added, a joint auditor was deleted, and a joint auditor was changed by two companies, over the same time period. In the cases of joint auditorships, the corporate client was included with both audit firms. There were only ten of these in the research group.

The First Two Auditor-Client Comparative Analyses

The names of the auditors of companies that had lobbied the ASSC/ASC were obtained from the annual report and accounts of the companies between 1969 and 1982, inclusive. The companies were grouped together according to their auditor and each company's preference on individual EDs was recorded as L, C or N, using the developed criteria (see Table 2). The ED comments of each audit firm were similarly categorised as L, C or N,

in order to facilitate comparison with their client companies.

First Test

For each auditor and each ED, the lobbying preference was determined for the majority of client companies which had submitted comments, and then compared with the auditor's preference to see if it 'agreed' or 'disagreed'. This was done for each firm and its client companies. For example, if the preferences of companies X, Y and Z on a particular ED were L, L and C, respectively, and the auditor's preference was L, then clearly the auditor and the majority of companies agreed on this particular ED. Tied preferences such as: L, L, C and C for companies A, B, C and D, respectively, were included once in both the agreed and disagreed categories for EDs where the auditor's preference on an ED was either L or C,⁸ but in the disagreed category where the auditor's preference on an ED was deemed to be N. Comments were excluded from the analysis in instances where only a corporate client had lobbied and not the auditor, and *vice versa*. There were 27 audit firms and 126 corporate clients in the usable research group.⁹

For each audit firm, the agreed and disagreed majority scores on individual EDs were aggregated by counting the number of agreed majority scores and the number of disagreed majority scores. The Chi-square One-Sample Test was used to test the significance of the difference between the agreed majority and disagreed majority scores in cases where as hypothesised the former number was the larger one.

Second Test

In addition, for each auditor, the overall total number of times that a particular auditor agreed with the comments of its corporate clients across all EDs was obtained. Likewise, a count was made of the number of times that each auditor disagreed with its corporate clients. For example, if the profit preferences of companies M, N and O on a particular ED were C, C and L, respectively, and the auditor's preference was C, the two instances of agreement and the one instance of disagreement would be added to the number of times that this particular auditor and its client companies agreed and disagreed, respectively, on all other EDs. If an auditor's comments followed those of a majority of its clients as hypothesised, it would be expected that the agreed total would be significantly greater

⁸The first test was repeated at both an aggregated and a disaggregated level with these tied preferences excluded. The results were consistent with those reported in this paper.

⁹Six companies were not included because their records were not available at the Companies Registration Office (CRO) in Cardiff or in Edinburgh.

Table 3 Auditor/Client Aggregate Scores

Audit Firms	Agreed No.		Disagreed No.		Total No.	
	Majority Scores	Overall Total	Majority Scores	Overall Total	Majority Scores	Overall Total
A	7	25	10	48	17	73
B	9	36	12	47	21	83
C	7	10	9	15	16	25
D	11	49	11	43	22	92
E	11	19	8	10	19	29
F	6	6	8	8	14	14
G	11	21	9	24	20	45
H	6	10	5	7	11	17
I	31	44	31	43	62	87
Total	99	220	103	245	202	465

than the disagreed total. The null hypothesis is that the agreed total and disagreed total would be equal (i.e., just a random pattern). In cases where the agreed frequency was greater than the disagreed frequency, the significance of the difference was again tested using the Chi-square One-Sample Test.

Results of Tests 1 and 2

Both the majority scores and the overall total frequencies of agreement and disagreement are shown in Table 3. The auditors are represented by the letters A to I inclusive and include all the international Big Eight firms. They are listed in random order. The Chi-square One-Sample Test requires that each expected frequency must be a minimum of five when degrees of freedom = 1 (Siegel, 1956, p. 46). Individual audit firms with an aggregated total of less than ten when agreed and disagreed numbers are added, are combined together to form row I of Table 3.

In Table 3, the agreed majority score is greater than the disagreed majority score for the following three audit firms (one-tailed *p* values in parentheses): E(0.246), G(0.414) and H(0.382). The agreed overall total exceeds the disagreed overall total in the case of the following four auditors (one-tailed *p* values in parentheses): D(0.202), E(0.047), H(0.233) and I(0.457). Only the overall total difference of audit firm E is marginally significant at the 0.05 level. In the total row, the disagreed number is greater than the agreed number in both analyses.

Therefore, the results from these analyses do not support the hypothesis that company and audit firm lobbies were positively related and that auditors were not independent.

The Third Auditor-Client Comparative Analysis

The corporate clients of each audit firm in the research group were ranked according to the size

of the audit fees obtained from the annual reports of each company. This was done in each year that both the auditor and client(s) lobbied the ASSC/ASC on one or more of the selected 22 EDs issued between 1970 and 1982, inclusive, in order to test the hypothesis that auditors tended to support the lobbying position of their large (above median) fee clients. Conversely, it was hypothesised that the comments of smaller companies would tend to follow the lead of their auditors/professional advisors. The 'small' (below median) fee clients were used to represent smaller clients and to test for this latter possibility. These hypotheses were tested using auditors with two or more client companies that submitted comments on the same EDs as their auditor. The usable research group consisted of 14 auditors and 115 corporate clients.¹⁰

Table 4 shows the frequencies with which the comments of large and small fee clients agreed or disagreed with those of their auditors. The auditors disagreed (160) more often than they agreed (131) with large fee corporate clients and that was opposite to the former hypothesis. Likewise, small fee clients disagreed (67) more often than they agreed (62) with their audit firms and that was inconsistent with the latter hypothesis. In addition, Chi-square tests were conducted on the data but even at the 0.1 level, no significant differences were determined between the lobbying preferences of large or small fee clients or of the total group. The lobbying behaviour of clients *vis-à-vis* their auditors followed a random pattern. Therefore, there was no evidence to support the hypotheses that the size of auditor remuneration would be a factor in

¹⁰Excluded from the analysis were: auditors with only one client that submitted comments on common EDs; companies with auditors that did not lobby on common EDs; and six client companies with records that were not available at CRO in Cardiff or in Edinburgh.

Table 4 Auditor/Client Lobbying Agreement and Disagreement by Audit-Fee Size

	<i>Large (> Median) Fee Clients No. of Comments</i>	<i>Small (< Median) Fee Clients No. of Comments</i>	<i>Total No. of Comments</i>
Agreement	131	62	193
Disagreement	160	67	227
<i>Total No. of Comments</i>	<u>291</u>	<u>129</u>	<u>420</u>

determining the direction of the comments of auditors or that smaller companies would tend to comment in the same way as their auditors.

Disaggregated Tests

Additional tests were undertaken to help overcome any confounding effects on the results that might have been caused by grouping ED proposals that had the potential to change either: profit and reserves, profit variability, or the disclosure of potential gains and losses. The three tests were repeated separately for each of the above categories and only for those EDs for which the category was *clearly* relevant. These were: profit and reserves (EDs 1, 6, 11, 14, 15, 17, 19, 20, 25, 26, and 31); profit variability (EDs 5, 7, 21, and 27); and disclosure of gains and losses (EDs 2 and 23). On this basis, EDs 9, 16, 22, 29, and 30 were omitted from the disaggregated analyses. The results were consistent with those of the aggregated analyses, with no significant degree of lobbying agreement at the 0.05 level between auditors and their clients for any of the categories.

Summary, conclusions and further research

Three tests were conducted to see if auditors of UK companies tended to support the ED comments of the majority, or the most financially influential, of their clients. The third test was also used to identify any evidence that the comments of smaller clients tended to follow the lead of their audit firms/professional advisors. The analyses were conducted both at an aggregated and at a disaggregated level. The results did not indicate that auditor and client collusion took place.¹¹

In particular, the results seem to support the view that auditors were independent of their clients. This is consistent with the theory that audit

firms have too much to lose from unethical collusion with their clients and that it is rational in an economic sense for auditors to retain their independence (see Watts and Zimmerman, 1982).

Further Research

This paper reports some initial research in a UK context and further research work is needed to refine the analysis. For example, it is possible that there are some confounding industry factors, due to the large number of EDs included in the research group. In the case of some EDs, auditors may have faced some conflicting opinions from several influential clients in different industries and therefore may have decided either not to lobby or to tone down the language of their comments. Future research studies could try to control for such possible conflicts, for example by the analysis of EDs that relate to only one industrial class of client (e.g., ED28, Petroleum Revenue Tax) that are likely to be free from the problem of auditors trying to satisfy important clients from different industries with opposing points of view.

There may also be non-economic motivations that dominate the lobbying behaviour of auditors and accountants employed by their clients. For example, professional responsibility could be an influential factor (see Lazarsfeld, 1969), or they might experience a greater sense of well-being through increased power over the external standard setting procedure.¹² These and other possible motivations for lobbying could be pursued in further research studies.

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¹¹This outcome is generally consistent with the results of US studies by Haring (1979) and Puro (1984 and 1985). However, research reported by Watts and Zimmerman (1981) did find a statistically significant positive association between the lobbying positions of clients and their auditors.

¹²Hope and Gray (1982) used a sociological/political methodology to identify the power group(s) that had the most apparent political influence over the ASC in the formulation of SSAP 13 on accounting for research and development.

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General Price-level Adjustment: Some Properties of the Edwards and Bell Method

Mark Tippet and Geoffrey Whittington*

Abstract—The method of general price level adjustment proposed by Edwards and Bell differs from the traditional CPP method, insofar as it enables historical cost profit to be reconciled with real accounting income (CPP profit) by two steps within a single simple statement. Edwards and Bell's contribution is clarified in this paper, by proving rigorously the two theorems which underlie their method of applying general price level adjustment to historical cost. A numerical example is used to illustrate pure historical cost, traditional CPP, Edwards and Bell general price level adjustment, and Ijiri's dual, which is found to contain similar information to the Edwards and Bell system. This is followed by a discussion of Edwards and Bell's preferred method of price level adjustment to a replacement cost base. This method of adjustment, applied to a current cost base, underlay FAS33 as modified by FAS82 in the USA. Finally, Edwards and Bell's historical cost base is compared with a recent British proposal for a one-line adjustment to capture the effects of inflation on historical cost profit. The simplicity of the latter proposal lies in the form rather than the substance of the information presented.

Introduction

In the English-speaking world, inflation accounting has recently fallen into disfavour, following the experiments of the early 1980s. These experiments were the outcome of the strenuous debates of the mid-1970s, when high inflation rates ensured that inflation accounting was regarded as an important practical issue. Accounting standards were adopted in the USA (FAS33, 1979 subsequently amended by FAS82, 1985) and in the UK (SSAP16, 1980) which attempted to deal with the problem of inflation.¹ Both of these standards involved an element of asset revaluation (something which may be relevant even in the absence of inflation, although inflation makes the problem seem more urgent) and an element of adjustment of the capital maintenance concept to remove the effects of inflation from the profit and loss account. In the USA, the latter adjustment was based on the

general price level ('real financial capital maintenance'), and could be described as being broadly in the spirit of Edwards and Bell's (1961) classic work, which is discussed subsequently in this paper. In the UK, the capital maintenance concept adopted was based on the specific prices of the firm's assets, combined with the controversial gearing adjustment, which could be interpreted as an attempt to make some allowances for changes in the general price level, albeit an inadequate one (see Archer and Peasnell, 1984). Subsequently, the Accounting Standards Committee in the UK moved closer to real financial capital maintenance in its non-mandatory guidance handbook (ASC, 1986).

Both in the UK and the USA, the inflation accounting experiment has recently (1985 in the UK and 1986 in the USA) been halted by the withdrawal of the mandatory nature of the relevant accounting standards. The reasons for this are complex, but the fall in the rate of inflation is a crucial factor. However, there can be no certainty that the fall in inflation rates in the English-speaking world is permanent, and there are important parts of the world (notably Latin America) where inflation is currently at high enough levels to justify compulsory adjustments for it in accounts. Thus, inflation accounting² remains an important

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¹In Australia and New Zealand there was a similar debate but this did not culminate in the promulgation of mandatory standards. Tweedie and Whittington (1984) provide a comprehensive survey of this debate in the English-speaking world and elsewhere.

²By this, we mean accounting for changes in the general price level. The associated, but distinct, problem of accounting for the specific price changes of individual assets remains potentially important even in the absence of inflation and underlies a number of current problems of accounting standards.

issue for the accounting theorist. Moreover, the debate on practical accounting standards in this field was marked by considerable confusion, and it may be as well to clear some of this confusion before the debate is once again muddled by pressure to find a quick practical solution which is acceptable to all parties to the standard-setting process.

This paper addresses the specific issue of adjusting accounting profit for changes in the general price level (pure inflation). It does so within the simple and elegant framework proposed by Edwards and Bell (1961). It is hoped that the analysis in this paper will contribute generally to an understanding of the nature of such adjustments. However, it has particular relevance to the belief that inflation should be dealt with by a simple one-line adjustment, as proposed, for example, by Archer and Steele (1984) on the basis of a survey of opinions of business managers. It is necessary to realise that important and possibly complex assumptions lie behind apparently simple adjustments. In particular, the valuation basis on which the one-line adjustment is made requires careful consideration.

Edwards and Bell's (1961) book has had a considerable impact both on accounting thought and on accounting practice (particularly FAS33 and FAS82 in the USA) during the past twenty-five years. This book was remarkable in at least three characteristics. Firstly, it attempted to build an accounting system on a rigorous theory of business income measurement. Secondly, it devised accounting systems which enabled a wide variety of different accounting information to be retrieved, e.g. in its distinctions between operating gains and holding gains, realised income and realisable income, and real gains and fictional gains. Thirdly, it emphasised 'the fundamental role of individual price changes' (Chapter VII) relative to 'the subsidiary role of price-level changes' (Chapter VIII); this was in contrast with the earlier pioneers of stabilised accounting systems, such as Sweeney (1936), who, under the influence of the European experience of hyper-inflation in the 1920s, had tended to emphasise the primary importance of general price level stabilisation rather than specific asset revaluation, thus encouraging support for historical cost-based Constant Purchasing Power (CPP) systems. The present paper concentrates on one aspect of the second of these characteristics, namely the Edwards and Bell general price level adjustment which enables the separation of real and fictitious gains. It will be observed, from the third characteristic described above, that the price level adjustment was regarded by Edwards and Bell as of secondary rather than of primary importance. Nevertheless, it is an integral part of their system and is the one which might most appropriately be described as inflation accounting.

The plan of the rest of this paper is as follows. Section Two presents a numerical example to be used in subsequent demonstrations, the example initially being given in pure historical cost terms. Section Three describes and illustrates the Edwards and Bell system of general price level adjustment, and the theorems upon which it is founded. For expository purposes, we apply the Edwards and Bell price level adjustment to historical cost accounts, deriving what they described (p. 130) as 'real accounting profit'. This enables us to compare their approach with the 'traditional' CPP method of adjustment derived from Sweeney and others, and, in Section Four, with the Ijiri 'dual' interpretation of CPP. In Section Five, the Edwards and Bell price level model is applied to replacement cost data,³ which was their preferred valuation base. This enables us to demonstrate the importance of the choice of valuation base in determining one-line adjustments for inflation.

A numerical example

This section gives the basic facts of the numerical example to be used to illustrate certain results in the following section, together with the mathematical notation which will be used in stating and proving properties of the system. We use discrete notation, which mirrors the nature of accounting transactions, each transaction being identified by the precise time, t , at which it occurred.⁴

$$\text{Sales: } \sum_{t=1}^T S(t) = 26,500$$

where $S(t)$ are sales transactions in the period, totalling T in all.

For calculating cost of sales we assume:

$$\text{Opening Stock: } N_s(O) = 10,000$$

where $N_s(t)$ is the historical cost of inventory on hand on completion of transaction t .

$$\text{Purchases of Stock: } \sum_{t=1}^T A_s(t) = 9,400$$

³Edwards and Bell (1961) originally preferred replacement cost, but their more recent writings favour the eclectic 'value to the firm' principle used in current cost accounting, as in FAS33 and SSAP16. See, for example, Bell and Johnson (1979).

⁴Our original exposition and proofs used calculus and, by the use of the Stieltjes integral (Ferrar, 1958, p. 157), could be applied to both the discrete and the continuous cases. However, we have accepted the suggestion of one of the referees, Professor Ken Peasnell, that a more simple exposition, in discrete terms alone, would have greater clarity and intuitive appeal to an accounting audience. The proof in the present version therefore follows the lines suggested by Peasnell. Those wishing a more powerful, but more complex, proof can obtain an earlier version of the paper from either author.

where $A_s(t)$ is purchases (additions to inventory) in transaction t .

$$\text{Cost of Sales: } \sum_{t=1}^T D_s(t) = 13,500$$

where $D_s(t)$ is the historical cost of sales (disposals of inventory) in transaction t .

Because closing stock, at the end of the period ($N_s(T)$), is equal to opening stock ($N_s(O)$), plus purchases ($A_s(t)$), less disposals ($D_s(t)$), summed over the period we have:

$$\begin{aligned} \text{Closing Stock: } N_s(T) \\ = 10,000 + 9,400 - 13,500 = 5,900 \end{aligned}$$

We assume also that the firm possesses a building, with initial cost ($N_b(O) = 80,000$) and a life of twenty years. Assuming that there will be no salvage value and that straight-line depreciation ($D_b(t)$) is to be applied,⁵ we have:

$$\begin{aligned} \text{Net Book Value} \\ \text{of Building: } N_b(T) = N_b(O) \\ - \sum_{t=1}^T D_b(t) = 80,000 - 4,000 = 76,000. \end{aligned}$$

Combining the above expressions for the two types of non-monetary assets (N), stocks (N_s) and the building (N_b) gives us:

$$\begin{aligned} \text{Non-monetary Assets: } N(T) \\ = 90,000 - 8,100 = 81,900. \end{aligned}$$

If we define $F(t)$ as the historical cost measure of shareholders' funds after transaction t , and if we assume that there are no contributions or withdrawals by shareholders after time zero, then $F(t)$ will have its initial value ($F(O)$), plus accumulated profit which, on the facts given above, will be sales ($S(t)$), less cost of goods sold ($D_s(t)$), less depreciation ($D_b(t)$), less other expenses ($E(t)$), all summed from 1 to t . If we group the asset disposals together ($D(t) = D_s(t) + D_b(t)$), we have:

Closing Shareholders' Funds:

$$F(T) = F(O) + \sum_{t=1}^T [S(t) - D(t) - E(t)]$$

If we assume that shareholders' initial contribution was £50,000 and that

$$\sum_{t=1}^T E(t) = 0,$$

⁵Depreciation of this type is strictly a continuous function of time, and is therefore dealt with more rigorously by the use of calculus, as in our original exposition (see footnote 4). However, we can accommodate straight line depreciation in the discrete analysis by assuming that it is calculated separately for each segment of time between each successive pair of transactions.

and substituting the values for sales and disposals assumed above, we have:

$$F(T) = 50,000 + 9,000 = 59,000.$$

If we assume that stocks and the building are the only non-monetary assets the firm holds, the difference between these assets ($N(t)$) and shareholders' funds ($F(t)$) will be made up by the firm's net monetary position ($m(t)$), which may involve net borrowing (when $N(t) > F(t)$) or by net monetary asset holding (when $F(t) > N(t)$). In general:

$$\text{Net monetary position: } m(t) = F(t) - N(t)$$

where a positive value of m implies net monetary asset holding, and a negative value implies net borrowing. On the facts assumed earlier, we have:

Opening Net monetary position:

$$m(O) = -40,000$$

Closing Net monetary position:

$$m(T) = -40,000 + 17,100 = -22,900.$$

In other words, the firm started out with £40,000 of net borrowing but had a positive cash flow of £17,100 between time zero and time one, reducing net monetary borrowing to £22,900. For expository purposes, it will be convenient to use the difference operator $\Delta m(t)$ to denote the change in the net monetary position resulting from transaction t , so that, over the whole period:

$$m(T) = m(O) + \sum_{t=1}^T \Delta m(t).$$

The conventional historical cost accounts for the period $t = 0$ to $t = 1$ implied by the above assumptions are shown in Table 1. In the following section, we shall use the Edwards and Bell approach to examine the effects of inflation by assuming that an index of general purchasing power ($I(t)$) rises by 10% over the relevant period $[O, T]$:

$$I(T) = 100 + 10 = 110.$$

The Edwards and Bell model of general price level adjustment

The Edwards and Bell general price level accounting adjustment is founded upon two fundamental theorems. The first of these is that the net effect of general price level adjustments to remove the effects of inflation from income and net assets held during the period is identically equal to the general price level adjustment to initial net worth.⁶ An important corollary of this is that the net amount of such adjustments (which Edwards and Bell would describe as 'fictional realizable cost savings')

⁶An informal proof of this proposition appears on p. 250 of Edwards and Bell (1961).

Table 1
Historical Cost Accounts

<i>Balance Sheet</i> <i>at $t = 0$</i>			
	£		£
<i>Shareholders' Funds</i>		<i>Fixed Assets</i>	
Capital subscribed	50,000	Buildings at cost	80,000
<i>Current Liability</i>		<i>Current Asset</i>	
Net monetary borrowing	40,000	Stock	10,000
	<u>90,000</u>		<u>90,000</u>
<i>Profit and Loss Statement</i> <i>for the period $[0, T]$</i>			
	£		£
Sales			26,500
Less Cost of Goods Sold			
Opening Stock		10,000	
Purchases		9,400	
		<u>19,400</u>	
Less Closing Stock		5,900	
			<u>13,500</u>
Gross Profit			<u>13,000</u>
Less Depreciation			4,000
Net Profit			<u>9,000</u>
<i>Balance Sheet</i> <i>at $t = T$</i>			
	£		£
<i>Shareholders' Funds</i>		<i>Fixed Assets</i>	
Capital subscribed	50,000	Building, at cost	80,000
Add Accumulated profit	9,000	Less Accumulated depreciation	4,000
	<u>59,000</u>		<u>76,000</u>
<i>Current Liability</i>		<i>Current Assets</i>	
Net monetary borrowing	22,900	Stock	5,900
	<u>81,900</u>		<u>81,900</u>

is independent of the transactions occurring during the period (since it can be expressed as a function of the price level and initial net worth only). The second theorem is that historical cost income, less fictional realisable cost savings of the period, plus the historical cost/constant purchasing power measure of net unrealised cost savings accruing during the period is equal to CPP income,⁷ i.e. historical cost income adjusted for general price level changes (as proposed by PSSAP7 (1974) in the UK and APB3 (1969) and the 1974 FASB Exposure Draft in the USA). Edwards and Bell describe CPP income as 'real accounting profit'. Below, we state

these theorems precisely, discuss their significance, and illustrate them numerically.

Theorem 1 and its Corollary

Theorem 1 states that the net sum of the general price level adjustments to remove the inflationary elements involving income and net assets held during the period (fictional realisable cost savings) is identically equal to the general price level adjustment of initial net worth ($F(0)$). This theorem has an important corollary, the *Independence Theorem*, which states that the total of the fictional realisable cost savings accruing during a period (i.e. the general price level adjustments to income accruing on net assets held during the period) is independent of the transactions occurring during that period.

In terms of the algebraic notation used earlier, the general price level adjustments referred to in

⁷See pp. 127 and 130 of Edwards and Bell (1961), which also provides reconciliations of these income measures with various alternatives such as Edwards and Bell's preferred 'real business profit', which underly FAS33.

Theorem 1 may be stated as:

$$\begin{aligned} & \left(\sum_{t=1}^T [D(t) + E(t) - S(t)] \left[\frac{I(T) - I(t)}{I(t)} \right] \right) \\ & + \left(m(O) \left[\frac{I(T)}{I(O)} - 1 \right] \right) \\ & + \sum_{t=1}^T \Delta m(t) \left[\frac{I(T) - I(t)}{I(t)} \right] \\ & + \left(N(O) \left[\frac{I(T)}{I(O)} - 1 \right] \right) \\ & + \sum_{t=1}^T [A(t) - D(t)] \left[\frac{I(T) - I(t)}{I(t)} \right] \\ & = F(O) \left[\frac{I(T)}{I(O)} - 1 \right] \end{aligned} \quad (1)$$

The left hand side of this relationship shows the adjustments which are necessary to convert historical cost profit to general price level adjusted profit, by the CPP method. A positive sign indicates a deduction from historical cost profit. The adjustments have three major components (indicated by curved brackets). The first is the familiar restatement of operating profit ($D(t) + E(t) - S(t)$) in terms of the closing price level.⁸ The signs are reversed here so that a profit [$S(t) > (D(t) + E(t))$] will give rise to a positive adjustment (i.e. a negative deduction) in the restatement process. The second major component is the restatement of net monetary position (opening position $m(O)$) amended by subsequent changes $\Delta m(t)$: see Tippet (1982) for an explanation of this adjustment). The third major component provides a similar restatement of non-monetary assets to measure closing assets in closing currency units. The latter two adjustments are calculations of fictional realisable holding gains on monetary and non-monetary assets respectively. They will therefore be deducted from historical cost profit in arriving at a price level adjusted profit, if they are positive (i.e. inflation is positive and there are net asset balances), but they will be an addition if they are negative (which will occur when, as in our example, there is a 'gain on borrowing' due to the net monetary position being negative in a period of inflation).

The right hand side of (1) asserts the fundamental proposition of Theorem 1, namely that all

of the CPP adjustments on the left hand side sum together to opening shareholders' funds ($F(O)$) multiplied by the proportionate rise in the general price level during the period [$I(T)/I(O) - 1$]. The fact that the right hand side contains no transaction of the firm during the period demonstrates the validity of the Independence Theorem.

Proof of Theorem 1

By definition:

$$F(O) \equiv N(O) + m(O) \quad (2)$$

Substituting in (1) and rearranging gives:

$$\sum_{t=1}^T [E(t) - S(t) + \Delta m(t) + A(t)] \times \left[\frac{I(T) - I(t)}{I(t)} \right] = 0 \quad (3)$$

This is the Independence Theorem. Also, by definition:

$$m(t) = F(t) + N(t)$$

and

$$\Delta m(t) = \Delta F(t) + \Delta N(t) = S(t) - E(t) - A(t) \quad (4)$$

Substituting the right hand side of (4) for $\Delta m(t)$ in (3) proves Theorem 1.

Numerical Illustration

These adjustments, and the theorem, are illustrated numerically below using the example given in the previous section and making the assumption that flows can be adjusted by taking the mid-year index of 105 as the average price level at which they took place. We also assume that closing stocks were purchased at a time when the price index was 109, i.e. FIFO stock measurement is used, and stocks were acquired recently. The three adjustments are calculated numerically in Table 2.

The corollary of Theorem 1, the Independence Theorem, is demonstrated as follows. The net CPP adjustment calculated above can be seen to be equivalent to the general purchasing power adjustment of opening shareholders' funds:

$$£50,000 \times \left[\frac{110}{100} - 1 \right] = £5,000$$

As this relationship always holds, it follows that the net general purchasing power adjustment is independent of transactions which took place during the period, since it can be expressed as a function of the opening net worth and the change in the price index.

It should be noted that the measure of opening net worth will depend upon the valuation conventions adopted in the opening balance sheet. As we shall discuss further, general price level adjust-

⁸Strictly, the index applied to $D(t)$ in the first and third major components should be $I(T) - (t')/I(t')$, where t' is the acquisition date of the asset disposed of at t (or time O if assets were restated in beginning-of-year currency). However, since $D(t)$ cancels out in the subsequent rearrangement, this refinement has been ignored in (1), although the appropriate adjustment is made in the numerical example.

Table 2
Calculation of General Price Level Adjustments

1. Sales and Expenses Adjustment:

Sales	$26,500 \times \left[\frac{110}{105} - 1 \right]$	(1,262)	
Cost of goods sold:			
Opening stock	$10,000 \times \left[\frac{110}{100} - 1 \right]$	1,000	
Purchases	$9,400 \times \left[\frac{110}{105} - 1 \right]$	448	
Less Closing Stock	$5,900 \times \left[\frac{110}{109} - 1 \right]$	54	
		1,394	
Depreciation	$4,000 \times \left[\frac{110}{100} - 1 \right]$		132
			400
			<u>532</u>

2. Loss (or Gain) on Monetary Items:

Opening balance (overdraft)	$(40,000) \times \left[\frac{110}{100} - 1 \right]$	(4,000)	
Receipts from sales	$26,500 \times \left[\frac{110}{105} - 1 \right]$	1,262	
Payments for purchases	$(9,400) \times \left[\frac{110}{105} - 1 \right]$	(448)	
			(3,186)

3. Re-statement of non-Monetary Assets

Closing stock	$5,900 \times \left[\frac{110}{109} - 1 \right]$	54	
Building: cost	$80,000 \times \left[\frac{110}{100} - 1 \right]$	8,000	
Less Depreciation	$4,000 \times \left[\frac{110}{100} - 1 \right]$	(400)	
		7,600	7,654
Net adjustment (deducted from profit)			<u>£5,000</u>

ment of replacement cost values will give a different result from adjustment of historical cost values. However, Theorem 1 and its corollary will still hold in a replacement cost (or current cost) valuation framework: the net adjustments necessary to remove the effects of inflation from the profits of a period will still be independent of transactions during that period.

Theorem 2

The second underlying theorem of the Edwards and Bell system shows how CPP-adjusted income is related to historical cost income. It states that CPP income (real accounting profit) is equal to historical cost income, less the sum of the general price level adjustments which were the subject of Theorem 1 (fictional realisable cost savings), plus net unrealised cost savings accruing during the

period (due to the effect of changing price levels on the price level restatement of non-monetary assets held at the end of the period, less similar gains for earlier periods contained in the value of non-monetary assets held at the beginning of the period and realised during the period). Thus, there is a simple relationship between historical cost profit and what Edwards and Bell call real accounting income, which is, in turn, identically equal to CPP income. Stated more rigorously, the theorem is:

$$[F(T) - F(O)] - [F(O) - N(O)] \left[\frac{I(T)}{I(O)} - 1 \right] \\ + \sum_{t=1}^T [A(t) - D(t)] \left[\frac{I(T) - I(t)}{I(t)} \right]$$

$$\begin{aligned}
&= \sum_{t=1}^T [S(t) - D(t) - E(t)] + \sum_{t=1}^T [S(t) \\
&\quad - D(t) - E(t)] \left[\frac{I(T) - I(t)}{I(t)} \right] \\
&\quad - m(O) \left[\frac{I(T)}{I(O)} - 1 \right] \\
&\quad - \sum_{t=1}^T \Delta m(t) \left[\frac{I(T) - I(t)}{I(t)} \right] \quad (2)
\end{aligned}$$

The left hand side of the above equation is Edwards and Bell's definition of real accounting income. The first term is historical cost accounting income, change in nominal value of shareholders' net worth over the period. The first part of the second term (relating to $F(O)$) is the general index adjustment of opening shareholders' net worth in order to remove the fictional element in realisable cost savings (which was the subject of Theorem 1). The second part of the second term (relating to $N(O)$) and the third term (relating to $A(t)$ and $D(t)$) represent the net unrealised cost savings of the period, based upon the CPP assumption that non-monetary assets appreciate in line with the general price index. CPP-adjusted income, or what Edwards and Bell termed 'Real Accounting Profit', being a realised concept, in effect subtracts from nominal historical cost income all realised fictional gains on non-monetary assets (there being no fictional gains on monetary assets), but leaves in all unrealised fictional gains on non-monetary assets.⁹

The right hand side of the equation is the CPP income for the period. The first term is historical cost income calculated on the conventional flow basis and the second term adjusts this for general price level changes. The third and fourth terms deduct the general price level loss on holding net monetary assets. There is no corresponding loss on

holding non-monetary assets because of the assumption that they appreciate in line with the general price level.

The proof is simple. By definition,

$$[F(T) - F(O)] = \sum_{t=1}^T [S(t) - D(t) - E(t)].$$

Cancelling out these terms leaves us with a rearranged form of Theorem 1, which has already been proved.

In terms of the numerical example used in the previous section, the calculation of real accounting profit (CPP income), according to the definition on the left hand side of the equation, is given in Table 3.

The full traditional CPP model is applied to the numerical example in Table 4.

Comparison of the Edwards and Bell calculation, with the traditional CPP format, shows that the principal advantage of the Edwards and Bell approach is that it provides a method by which both historical cost and CPP data can be merged into one Profit and Loss Statement, but in such a way that none of the historical cost information is lost in the process. Thus, the Edwards and Bell approach starts with the calculation of historical cost profit, and the CPP adjustment is achieved by the subsequent deduction of fictional realisable cost savings and addition of fictional unrealised cost savings. Relative to the traditional CPP figures, there is some loss of information, insofar as the fictional cost savings are reported as aggregates, rather than being assigned to individual components of the Profit and Loss Account, but this problem could be overcome by analysing the aggregates in a supporting statement. Moreover, in comparison with the traditional historical cost system, the Edwards and Bell financial statements present more information and, by virtue of Blackwell's fineness theorem, cannot be any less valuable than their historical cost counterpart (Marshak and Radner, 1972, p. 54).

With regard to one-line adjustments, the Edwards and Bell format moves from historical cost income to price level adjusted 'Real Accounting Profit' in two lines rather than one. The price level adjustment of capital (Fictional Realizable Cost Savings) is deducted, but the restatement of assets (Fictional Unrealized Cost Savings) is added. The two adjustments could be netted out to achieve the apparent simplicity of a one-line adjustment, but this would lead to a loss of information. Moreover, the second line of the adjustment is controversial because many (including Edwards and Bell) would prefer that the unrealised cost savings be measured by reference to specific prices rather than the general price level alone. Although we have here explored the properties of general price level adjustment of the historical cost base, similar arguments could be advanced in favour of

⁹It should be noted that this statement of the Edwards and Bell adjustments is strictly correct only if the opening asset values ($N(O)$) are at the same price-level restated amounts as under CPP. Otherwise, we would need an extra term to adjust the opening asset value $N(O)$ by the general index change from the time of acquisition to (O) , and (consequently) to adjust $F(O)$ ($= N(O) + m(O)$) and $D(t)$ (which may contain an element of the $N(O)$ adjustment, comprising realisable gains of earlier periods, by disposal, in the current period). In our numerical example, we avoid the need for opening balance sheet adjustments by the commonly adopted device of assuming that the firm is in its opening year of operation (the assumption that there has been a stable price level in the past would achieve the same result). The current value application of the system, discussed below, does not suffer from this problem, because opening balance sheets are stated at current prices (at time O) on a consistent basis. The essential problem of historical cost is that it aggregates historical costs established at different times (acquisition dates). Footnote 8 also applies to (2) and this problem also is an outcome of historical cost valuation and does not apply when current values are used.

Table 3
Edwards and Bell Calculation of Real Accounting Income

Historical cost income		9,000
Less Fictional realisable cost savings $\left[50,000 \times \left[\frac{110}{100} - 1 \right] \right]$		<u>5,000</u>
Add Fictional unrealised cost savings		4,000
Building $\left[(80,000 - 4,000) \times \left[\frac{110}{100} - 1 \right] \right]$	7,600	
Stock $\left[5,900 \times \left[\frac{100}{109} - 1 \right] \right]$	<u>54</u>	<u>7,654</u>
Real Accounting Profit		<u><u>£11,654</u></u>

Edwards and Bell's proposal for adding their form of general price level adjustment to the replacement cost or current cost base, as was the case in the USA's current cost standard, FAS33. This argument is developed further in the final section of this paper.

Ijiri's dual

The present analysis would be incomplete without comparison of the Edwards and Bell method with

Ijiri's 'dual' interpretation of the CPP model (Ijiri, 1976). In terms of our numerical example, Ijiri's reconciliation of 'conventional earnings' (that is, realised or historical cost income) with 'price level restated earnings' (real accounting profit or CPP income) is given in Table 5.

The net price level holding gains (price level holding gains recognised, less price level holding gains realised: £8,186 - £532 = £7,654) are the Edwards and Bell fictional unrealised cost savings. The 'price level capital charges' are equivalent to

Table 4
Traditional CPP Statements

<i>Profit and Loss Statement for the period [O, T]</i>			
	£		£
Sales	26,500	110/105	<u>27,762</u>
Less Cost of Goods Sold			
Opening stock	10,000	110/100	11,000
Purchases	9,400	110/105	<u>9,848</u>
	<u>19,400</u>		<u>20,848</u>
Less Closing Stock	5,900	110/109	<u>5,954</u>
	<u>13,500</u>		<u>14,894</u>
Gross Profit	13,000		12,868
Less Depreciation	4,000	110/100	<u>4,400</u>
Realised income	<u>£ 9,000</u>		<u>8,468</u>
Gain on holding net monetary liabilities			<u>3,186</u>
Real Accounting Profit			<u><u>£11,654</u></u>
<i>Balance Sheet at T</i>			
<i>Shareholders' Funds</i>		<i>Fixed Asset</i>	
Capital subscribed ($\times 110/100$)	55,000	Building (cost) ($\times 110/100$)	88,000
Add Accumulated profit	<u>11,654</u>	Less Accumulated depreciation	<u>4,400</u>
	<u>66,654</u>		<u>83,600</u>
<i>Current Liability</i>		<i>Current Assets</i>	
Net monetary borrowing	22,900	Stock ($\times 110/109$)	<u>5,954</u>
	<u>£89,554</u>		<u><u>£89,554</u></u>

Table 5
Ijiri's Dual Format

	£	£
Conventional (historical cost) earnings		9,000
Add Price level holding gains recognised:		
Building	8,000	
Sales	(1,262)	
Stock	<u>1,448</u>	<u>8,186</u>
		17,186
Less Price level holding gains realised:		
Building	400	
Sales	(1,262)	
Stock	<u>1,394</u>	<u>532</u>
Price level restated earnings before capital charges		16,654
Less Price level capital charges		5,000
Price level restated earnings		<u>£11,654</u>

the Edwards and Bell fictional realisable cost savings. Hence, Ijiri's dual can be regarded as a more detailed version of the Edwards and Bell model, in that it involves a restructured income statement, starting with historical cost income and deriving CPP income in a manner similar to that of Edwards and Bell. Since minor footnote disclosure in the Edwards and Bell financial statements allows full retrieval of the information in 'dual' type financial statements, Ijiri's proposal represents an improvement on its Edwards and Bell equivalent, only if we are concerned with the form rather than the content of financial statements, and even in that situation it would be necessary to demonstrate that the particular form adopted by Ijiri is superior to that proposed by Edwards and Bell.

A replacement cost valuation basis

Earlier we demonstrated some fundamental properties of the CPP system and Edwards and Bell's method of reconciling it with the traditional historical cost method of income measurement. Then we saw that Ijiri's 'dual' approach can be viewed as a variant of the Edwards and Bell approach. The latter approach is simple, elegant and powerful. Theorem 1 and its corollary provide a logical foundation for calculating the fictional realisable cost savings arising from inflation, simply by adjusting the opening net worth by the change in the general price index during the period. Theorem 2 shows how this piece of information, combined with a measure of net unrealised cost savings accruing during the period (which is also calculated on a general index basis), can transform historical cost income into CPP income. We have seen that certain proposals for simplified forms of inflation accounting which have been made

recently in the UK, notably by Archer and Steele (1984), rely for their theoretical foundation on these theorems. The Archer and Steele 'one-line adjustment' would be the sum of fictional realisable cost savings less unrealised cost savings accruing during the period, which, according to Theorem 2, is sufficient to transform historical cost profit into CPP profit.¹⁰

However, simplicity may be bought at the price of losing information content. The very simplicity of these adjustments means that they can be calculated (in the case of fictional realisable cost savings) or estimated (in the case of unrealised cost savings, which strictly requires precise dating of transactions in real assets) very easily from the historical cost accounts. Thus, there is little, if any, incremental information content, although access to the information may be made cheaper by the corporation doing the calculations for users, rather than the calculation being repeatedly performed by many independent users, and the availability of the calculations in the accounts may also perform an educational function for some users.

A more serious objection is that confining the reporting system to historical cost and CPP (as a one-line general price index would do) ignores entirely the impact of specific price changes of the assets used and held by the firm. Edwards and Bell regard such information as a crucial component of their system. It has already been pointed out that the basis of valuation of opening net worth ($F(O)$) will affect the calculation of fictional realisable holding gains, in accordance with Theorem 1. Edwards and Bell would regard valuation at

¹⁰It is, however, necessary to remember the point made in footnote 9. A one line adjustment which produced a CPP income figure would have to be based on CPP-adjusted opening balance sheet values ($N(O)$ and $F(O)$).

Table 6
Edwards and Bell Real Terms Profit and Loss Statement
for the Period [O, T]

	£	£
Sales		26,500
Less Cost of Goods Sold		
Opening Stock	10,000	
Purchases	9,400	
	19,400	
Realisable Cost Savings	5,400	
	24,800	
Closing Stock	8,400	16,400
		10,100
Depreciation		4,500
Current Operating Profit		5,600
Realisable Cost Savings	24,900	
Less Fictional component	5,000	19,900
Real Business Profit		25,500
Unrealised Cost Savings	21,500	
Less Fictional component	7,654	13,846
Real Accounting Profit		<u>£11,654</u>

Edwards and Bell Real Terms Balance Sheet at T

	£		£
<i>Shareholders' Funds</i>		<i>Fixed Assets</i>	
Capital subscribed	50,000	Building	100,000
Price level adjustment	5,000	Accumulated depreciation	5,000
	55,000		95,000
Real realised surplus	11,654		
Real unrealised surplus	13,846		
Total Shareholders' Funds	80,500		
<i>Current Liability</i>		<i>Current Assets</i>	
Net monetary borrowing	22,900	Stock	8,400
	<u>£103,400</u>		<u>£103,400</u>

current cost rather than historical cost as providing a more useful measurement of opening net worth. Equally, they would advocate the calculation of net unrealised holding gains of the period (Theorem 2) by reference to changes in the specific prices of the assets involved rather than a general index. This, like the revaluation of opening net worth at current cost, introduces new information, which cannot be obtained by applying general indices to the historical cost data.

The resulting income measure, which Edwards and Bell describe as real business profit, includes real unrealised holding gains of the period, i.e. the extent to which assets held by the firm at the end of the period have risen in value (measured at current cost) in excess of their initial value restated by a general price index. The essence of this approach is that assets used or held during the period are charged to profit or valued at their current specific prices (unlike the indexed historical

cost approach of CPP), whilst the initial capital to be maintained before a profit is recognised is restated by applying a general price index for the period (as in the CPP case) but with the important difference that the initial capital is valued at current cost rather than historical cost.¹¹ Such a system is illustrated below.

We take the previous example but with the following additional assumptions about specific asset values:

Replacement cost of goods sold	£16,400
Replacement cost of ending inventory (T)	£8,400
Replacement cost of building at T	£100,000

¹¹Useful reconciliations of historical cost, replacement cost, CPP and Edwards and Bell 'real business profit' measures of income will be found in the introduction to Parker and Harcourt (1969), pp. 6-7, and in Edwards and Bell (1961), Chapter IV.

The average replacement cost of building is then

$$\frac{100,000 + 80,000}{2} = 90,000$$

so that depreciation is

$$\frac{90,000}{20} = £4,500$$

on a replacement cost basis.

Table 6 presents accounts based upon these assumptions, in a format consistent with the Edwards and Bell real terms model. We do not follow precisely the specimen formats presented in Edwards and Bell (1961, ch. 8), but the methods of computation are consistent with theirs (using average for the year monetary units, which they preferred to end of year units) as is the principle underlying the format, allowing the presentation of a number of alternative income measures. Our chosen format ends with a computation of real accounting profit, and this should facilitate comparison with the purely historical cost based model illustrated earlier. It should be noted that, for simplicity, our example relates to the first year of trading of a business. This produces two simple, but not generally applicable, consequences. Firstly, the total of fictional unrealised cost savings (£5,000) is the same as in the earlier historical cost based example: this is true in this special case because we have assumed that historical cost is identically equal to replacement cost in the opening balance sheet, so that shareholders' initial funds are £50,000 in both cases. Secondly, the accumulated realised surplus and unrealised cost savings in the closing balance sheet are equal to the amounts transferred from the profit and loss statement, since the opening balances were zero.

The profit and loss statement starts with a computation of current operating profit, a concept to which Edwards and Bell attach considerable importance. This represents sales revenue less the replacement costs of the resources used at the time of sale. Calculation of the replacement cost of goods sold is obtained by a two stage procedure. Firstly, the holding gain accruing on inventory (£5,400)¹² is added to inventory's opening replacement cost (£10,000) and the historic cost of purchases (£9,400), giving a total of £24,800. The ending replacement cost of inventory (£8,400) is then deducted from this, to give a replacement cost of goods sold of £16,400. The net effect of these two adjustments is what, in current cost accounting under SSAP16, was described as a cost of sales adjustment. The depreciation charge is also raised (by £500) to a replacement cost basis; this is based

on average value of the asset during the year, as preferred by Edwards and Bell, rather than the closing value, as used in SSAP16.

The next stage is to add various non-operating gains and losses (holding gains and losses) to operating income to derive what Edwards and Bell described as real business profit, and which is a measure of what is sometimes described as comprehensive income. Firstly, the realisable holding gains are added in. These constitute the nominal (money) holding gains during the period, whether they are disposed of during the period (realised holding gains) or held at the end (unrealised). The total of £24,900 comprises £5,400 on stocks (the adjustments to cost of sales) and £19,500 on the fixed asset (additional depreciation and appreciation of the closing value).¹³ From this, we then deduct the familiar general price level adjustment (fictional realisable cost savings, £5,000) necessary to maintain initial shareholders' funds in real (constant purchasing power) terms: we have already seen that this would be a different amount from that in the previous, historical cost based illustration, had we not assumed that replacement cost was equal to historical cost in the opening balance sheet.

This adjustment yields the measure of real business profit (£25,500), representing the total real gain from all sources during the period. We then deduct the unrealised element of real cost savings in the period (nominal gains of £21,500, comprising £2,500 in the value of closing stock and £19,000 in the closing value of the building, less the fictional element of these gains, £7,654, comprising £54 on closing stock and £7,600 on the building, as computed in Table 2) to give a bottom line of real accounting profit, as computed by a different route in our earlier, historical cost based, example. It should be emphasised that Edwards and Bell do not lay particular emphasis on this latter figure; they regard current operating profit and real business income, which reflect individual price changes (replacement cost in our example) as having greater significance. Indeed, the strength of the Edwards and Bell model is that it is possible to retrieve a number of alternative income measures, each of which might have particular relevance to some users of accounts in some circumstances, so that the number appearing on the bottom line of the profit and loss statement need have no particular importance.

The balance sheet now reflects the current replacement cost (at *T*) of the assets. The building is now valued at replacement cost (£100,000) less one year's depreciation (£5,000): of the depreciation figure £4,500 was charged against profit and £500 (the shortfall or 'backlog' due to profit being charged with average, rather than year-end, re-

¹²Details of how the holding gain on inventory (£5,400) is computed is to be found in Tippet (1979). This paper also explains the 'input-output' theorem upon which the calculation of cost of goods sold is based.

¹³See Tippet (1979) for the procedures involved.

placement cost) was offset against the unrealised holding gain. On the other side of the balance sheet, shareholders' initial capital subscribed (at $t = 0$) is price-level adjusted to compensate for inflation. The realised surplus which is then added to shareholders' funds represents unappropriated real accounting income (CPP income), and the unrealised surplus represents the real unrealised holding gains reported in the profit and loss statement. This latter component of shareholders' funds is the counterpart of the current cost reserve reported in current cost accounting under SSAP16.

It would have been possible to present the balance sheet in more detail (as in Edwards and Bell, 1961, p. 248) which would have shown assets at historical cost with subsequent revaluation adjustments shown separately and have given more detail in the computation of shareholders' funds. This would have more faithfully followed the Edwards and Bell principle of providing an information retrieval system, but it would have complicated our illustration. Equally, the Profit and Loss Statement could have been restated in year-end currency, which would have been more faithful to the strict CPP approach (all monetary units being then of a strictly common date). However, this would have been more complicated, and it is a consequence of Theorem 1 that we can dispense with these refinements and derive a CPP-adjusted profit figure (strictly two: Real Business Profit and Real Accounting Profit) without the complexities of full stabilisation.

Conclusions

In Section 3 we demonstrated the basic properties of Edwards and Bell's simple and elegant price level adjustment technique. This is founded on Theorem 1 and its corollary, the Independence Theorem, which states that the total of the general price level adjustments (fictional realisable cost savings) necessary to reduce nominal gains accruing during a period to real (constant purchasing power) term is independent of the transactions occurring during that period. From this we derived Theorem 2, which showed that historical cost income, less the fictional realisable cost savings which were the subject of Theorem 1, plus net unrealised cost savings during the period (gains due to the restatement of the value of assets held at the end of the period, to reflect changes in the general price level during the period, less unrealised gains of previous periods realised in the current period) is equal to conventional constant purchasing power (CPP) income. This enabled us to construct an extremely simple profit and loss statement which started with the computation of historical cost income and then proceeded to make the two aggregate adjustments (Theorem 2) which adjusted this to CPP income. This statement en-

abled full retrieval of historical cost data and avoided the somewhat complex general price-level restatement of all elements of the profit and loss statement, which is necessary for full CPP statements. In Section 4, Ijiri's dual formulation of the general price level adjustment model was described and illustrated, and it was found that this can be regarded as a variant of the Edwards and Bell approach, giving information at a less aggregated level.

It might appear superficially that this provided the basis for a very simple on-line adjustment for removing inflation from the profit and loss account. However, in Section 5 we pointed out that the Theorem 2 adjustment is a two-line adjustment, whose separate components might be expected to affect profit in opposite directions, so that its netting out into a one-line adjustment leads to loss of information. Moreover, both parts of the adjustment are sensitive to the valuation base. For illustrative purposes, Theorems 1 and 2 have been applied to a historical cost valuation base, using general price level indices to convert historical cost income to conventional CPP income. However, the same theorems could be applied to converting accounting income based on other valuation conventions (such as replacement cost, as preferred by Edwards and Bell) to real terms (such as Edwards and Bell's 'real business profit'). In such a case, both lines of the adjustment would take on different values: fictional realisable cost savings would be based on the contemporary (rather than historical) value of opening net worth and unrealised cost savings of the period would depend upon the changes in the specific prices of the assets held by the business. Many would regard the use of specific contemporary prices as providing more relevant information than the historical cost-based general price level adjustments used in conventional CPP accounts.

In conclusion, it is clear that simplicity and elegance can be bought at the price of aggregating data whose underlying complexity is as great as that of systems which appear to be less simple. Simple adjustments for inflation require that the users of the information understand and accept the underlying assumptions of the calculations. One-line adjustments are therefore simple only in appearance rather than in their use, since they are aggregations of other more detailed adjustments, each of which relies upon assumptions as to how changing prices should be allowed for (e.g. in the choice of price index) and may involve a degree of uncertainty in the measurement process (e.g. in measuring accruals in historical cost systems or current values in alternative systems). In other words, the simplicity of one-line adjustments is a matter of form rather than of substance. However, the Edwards and Bell format does have merits, other than its simplicity and elegance, because it

enables the retrieval of more than one type of information, and this is the obvious method of dealing with the fact that, in a realistic setting of imperfect and incomplete markets, no single 'true' income measure exists, which will satisfy all needs. Thus, accounts should be efficient vehicles for information retrieval rather than attempting to provide uniquely 'correct' bottom-line income figures.¹⁴

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¹⁴This view of the role of income measurement is well argued by Beaver and Demski (1979).

An Axiomatic Theory of Accounting Measurement—Part II

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Abstract—Willett (1987) described a transactions based theory of funds accounting. This paper extends the theory to explain asset and profit measurement. Eight axioms are listed which, when interpreted in the context of cost structures, are sufficient to justify the logic underlying the generation of accounting numbers in financial statements. Although the theory is expressed using deterministic concepts, one of its implications is that many derived accounting measurements used in practice (e.g. income calculations) are of an inherently probabilistic nature. The theory identifies the main stochastic variables which determine the statistical characteristics of such accounting numbers.

Introduction

This paper is the second instalment of a theory, the first part of which appeared in *Accounting and Business Research* in Spring 1987. The theory endeavours to describe the logical basis of conventional accounting measurement practice. The purpose of doing this is to determine what aspects of the real world accounting numbers represent and thereby furnish a better understanding of why such information might be useful to some decision makers. The first part of the theory demonstrated how it is possible, by using transactions concepts rather than valuation ones, to define costs objectively and empirically in such a way that they possess the arithmetic properties normally associated with them, and especially the conditions under which costs are additive. The second part describes the empirical structure which justifies the accountant's practice of matching costs with one another in production processes. This theory of matching is the logical foundation for the accounting identities described in Willett (1987, p. 163), Figure 1 of which is reproduced later for convenience. The theory explains why it makes empirical sense to classify costs into activities and how it is possible to define concepts like assets and profits before depreciation adjustments in terms of the cost concept.

The following section informally discusses the reasons for choosing a transactions based theory of the matching process. It is largely motivational in content and deals with the general purposive considerations underlying the axiomatic model considered more rigorously in the third section. The latter

section discusses eight further axioms which, together with those in Part I, are sufficient to accomplish the tasks described above, and it also sketches in the logical development of the theory. Both sections provide some illustrative material to aid in the interpretation of the theory. Some brief remarks about the applicability of theory to the many calculations included in both internal and external accounting reports and to its implications for the analysis of accounting measurement as a statistical process are contained in the concluding section.

A transactions based theory of matching

Any notion that physical things have a subjective utility value to the preparer or the user of accounts is avoided in transactions theory. Some arguments against the feasibility of using valuation concepts in theories of accounting measurement were discussed at length in Willett (1987, pp 161-2) and previous researches into the idea of matching and depreciation accounting indicate the considerable difficulties which arise when valuation concepts are utilised to explain them (e.g. Thomas, 1969 and 1974). In this section the background considerations for an alternative transactions theory of accounting profit measurement will be outlined leaving the more technical aspects of its development to the following section.

Debts are created and resources exchanged over time in transactions theory and that is the basis of everything in the system of measurement. The central idea in transactions based profit and asset measurement is that costs can be traced to economic activities so that they can be associated with levels of debt which can in turn be used as performance indicators. For example if an accountant is satisfied that input commodity *A* together with two hours of labour time of employee *X* has

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produced commodity B within an accounting period then, in constructing the conventional cost based contribution measurement, he directly ascertains the costs of commodity A and employee X and compares them to the revenue obtained from the sale of commodity B .¹

This specific case is clearly recognisable as an instance of 'matching' in practical accounting and the general nature of the matching process can easily be inferred from it: transaction costs, *already* assigned a monetary measurement by the debt agreed between the accounting entities which are parties to the transaction, are aggregated into economic activities on the basis of a *physical* production relation perceived by the accountant to exist between the resource sets which are components of those costs. In transactions theory matching simply boils down to an ability on the part of the accountant to partition the resource set (and therefore an entity's total cost set) in a stated interval of time into equivalence classes of physical activities.²

In trying to lay down the foundations of a rigorous theory of conventional accounting it would be inadequate simply to state that resources can be partitioned into physical activities. In order to be convincing it is necessary to describe what obvious properties of production relations allow the desired equivalence classes to be constructed. This is essentially what will be done in the next section. However a question of a motivational nature also arises which it will be helpful to discuss first.

What one ends up with by using the transactions concepts outlined above is a theory of accounting measurement having an almost complete emphasis on performance assessment. The many derived performance measures used both for internal management purposes (Kaplan, 1984) and external reporting (e.g. Watts and Zimmerman, 1986) depend in an essential way upon the assumption

that the concept of an activity cost described above makes empirical sense. The accounting identities summarised in Figure 1 reflect this assumption since it is a necessary condition for the classification of non-monetary accounts into equities and assets. The rest of this section will be devoted to a discussion explaining how a relatively objective measurement basis for the classification scheme in Figure 1 can be established.

Looking in more detail at the contents of Figure 1 it can be seen that the balance sheet at time S (Identity I) partitions its funds at S^3 , $\alpha(^1C^S)$, into m mutually exclusive activity costs, $\alpha(^1C^S)$, $\alpha(^2C^S)$, ..., $\alpha(^mC^S)$ (all measured on a monetary scale) so that the resource set component of each of the latter costs are pairwise disjoint, i.e.:

$$\alpha(^jC^S) = \alpha(^1C^S) + \alpha(^2C^S) + \dots + \alpha(^mC^S) \quad (1)$$

These measurements normally appear under the balance sheet headings, 'fixed assets' (at cost), 'stocks and work in progress' (at cost) and 'retained profits' (before adjusting for provisions), with the asset categories comprising unfinished activities at S and the equity category finished activities at S . Using similar notation at T (after S), Identity III can be similarly analysed into n activities:

$$\alpha(^jC^T) = \alpha(^1C^T) + \alpha(^2C^T) + \dots + \alpha(^nC^T) \quad (2)$$

The total change in funds $\alpha(^jC^T) - \alpha(^jC^S)$ during the accounting period S to T is analysed between changes in the cost of unfinished activities (changes in assets) in the Source and Application of Funds Statement (Identity II) and changes in the cost of finished activities ('retained profits before depreciation') in the Income Statement. The relationship of the latter to the opening and closing equity balances is, of course, the 'capital maintenance' identity of Figure 1.

The classification pattern described in Figure 1, the categorisation of costs into activities and the arithmetic associated with it, is based solely on pure cost data and a matching relation. *It does not incorporate any of the expectations data which accompanies costs in conventional financial statements in the preparation of provision calculations* and hence, by itself, it represents only a partial explanation of accounting calculations. Nevertheless, the significance of the Figure 1 model to accounting measurement is twofold.

On the one hand it defines the limits of objectivity in the process of measuring activity costs. While it is possible, although rare, to reach these limits in a world of incomplete information it is actually physically *impossible* to go beyond them (even with perfect information) and still be able to

¹In carrying out these calculations it may be considered necessary to estimate the costs involved on the basis of a supposed relationship between quantities and prices. However although this may be a common practical *estimation* technique for ascertaining the value of a theoretical cost it is not the measurement of an actual cost and there is no necessity in constructing a theory of accounting measurement to postulate functional relationships between unit prices and unit quantities as some have done (e.g. Thomas, 1969, 1974; Ijiri, 1975).

²On this interpretation matching is a process distinct from that of accruing costs by recognising debtors and creditors outstanding at the balance sheet date. If this theory of matching seems self-evident, it should be emphasised that its adoption leads to very different conclusions compared to those which follow from functional models of the matching process such as the type proposed by Thomas (1969, p 37). In that case definite and meaningful values cannot be assigned to goods and services unless the functional relationship has a unique solution. In transactions theory, by contrast, activities can be costed either by direct measurement or indirect estimation as long as it is possible to identify resource sets with a unique *physical* activity.

³As previously (Willett, 1987) C is a cost, α is an accounting function and the superscripts denote the special characteristics indicated.

Figure 1
Arithmetic Accounting Assumptions

A	I Opening equities +	+	II Retained profits +	=	III Closing equities +
B	Opening assets =	+	Changes in assets =	=	Closing assets =
C	-Opening funds	+	-Changes in funds	=	-Closing funds

Notes: 'Assets' are to be understood as 'non-monetary' accounts before deducting provisions (e.g. the cost of fixed assets); 'equities' include provisions such as accumulated depreciation as well as capital and reserve accounts; 'funds' are composed of 'monetary' accounts, debtors or creditors.

interpret the resulting number assignments in a direct, empirical manner. Beyond these limits, where costs appear to be allocated on a more arbitrary basis (as in the depreciation calculation), the model implies that statistical considerations must take the place of the deterministic concepts adopted thus far.

On the other hand the model described encapsulates the only known extensively measurable attribute (i.e. cost) which is unique to the subject matter of economics and which is so crucially important to the many derived measurements actually disclosed in financial statements. This is the strength of transactions theory. It can be used to explain a great deal more about the meaningfulness of conventional financial statement arithmetic than simply that which is contained in Figure 1. By interpreting many familiar financial calculations as derived measurements based on activity costs, time measurements and probability distributions of these the explanatory scope of the theory can be greatly extended. The resulting framework, in fact, provides a theoretical justification for understanding conventional accounting as a collection of estimates for a variety of purposes along the lines originally suggested by Brief and Owen (1970).

The chief risk in attempting to build a theory of accounting performance measurement based on these ideas is of asserting too much in the accountants' knowledge of physical production processes and consequently of running foul of criticisms of meaninglessness which *would* then be justified. There are, in fact, two main dangers in this regard: one is *appearing* to support the position that it is feasible to cost truly joint products separately and the other is *appearing* to assume that all costs entering into performance measurement must actually be measured (rather than just be

measurable in principle and capable of estimation). Both of these issues will now be examined in more detail by discussing a model of the accountant's understanding of the general nature of production processes.

A Model of the Physical Production Process

The type of physical product function usually proposed in the literature is one of the form:

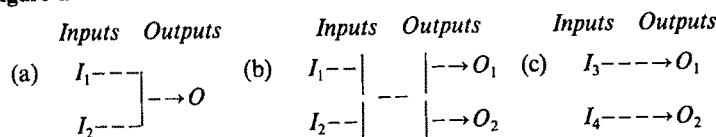
$$q(0) = f(q_i(I_i)) \quad i = 1, 2, \dots, m \quad (3)$$

where: 0 is an output commodity or service, I_i is a sequence of input commodities or services, q_i is a series of physical quantity measures (e.g. numbers of identical items, weight, volume, time etc.), f is a production function relating quantities of inputs to quantities of outputs.

It is often considered that any justification for conventional accounting measurement lies in the existence of a form of (3) which is of the 'many inputs to one output' type. Examples of this sort of theory of production functions can be found in Thomas (1969).

However, even with perfect information, such forms of production functions are in general untenable. The reason for this is that there may be no known method for physically producing a unit of output O without at the same time producing other commodities and services which it is desired to cost separately. This is the joint product problem which will be familiar to the reader through standard textbooks on management accounting (e.g. Horngren and Foster, 1987). While there may be several non-measurement justifications for adopting ultimately arbitrary cost allocations in joint product situations (e.g. in enhancing management control policies) the lack of empirical reference for the number assignments makes it essential to avoid any dependence upon a structural as-

Figure 2



Notes: $I_1 \cup I_2 = I_3 \cup I_4$

The terms I_1 , I_2 , O , O_1 and O_2 represent resource sets (i.e. sets containing anything in respect of which debts can be incurred) and the intended interpretation of the arrows is that they indicate an economic cause and effect between input resources and output resources. Production relations are envisaged as transforming either the physical state or the ownership right in the resource sets concerned over very small intervals of time which can be aggregated to form production sequences of any complexity matching inputs and outputs over longer periods of time such as accounting periods.

sumption which would make joint product costing possible in a measurement theory of accounting. So, to be explicit on this point, let it be quite clear that in transactions theory a 'production relation' (pr, for short) is always initially assumed to be a many-to-many mapping of inputs to outputs and that where prs are physically incapable of being separated it will not be possible to cost the joint outputs separately.

Figure 2 illustrates diagrammatically the distinction between the many to one pr ('type' 2(a)) and the many to many pr (type 2(b)). Type 2(c) shows an instance of a 'separable' pr. If prs like those shown in 2(c) do not exist (such that the physical outputs O_1 and O_2 can be traced by a new method of production to inputs I_3 and I_4 , where $I_3 \cup I_4 = I_1 \cup I_2$) then $O_1 \cup O_2$ will be called a *joint product* and 2(b) will be called a *joint relation*. Alternatively, if prs like those in Figure 2(c) do exist the relation in 2(b) will be called *separable*. This principle, of the *irrelevance of joint product costing*, is incorporated into the axioms of the next section and thus ensures that it is impossible to give any empirical meaning to the separate costing of truly joint products in transactions theory.

Clearly it is not going to be possible to get very far with a theory of conventional accounting measurement unless the vast majority of prs of type 2(b) are separable. In recent theory, mainly due to the influence of Thomas (1969, 1974) there has been a perception that all production processes are hopelessly joint. The chief cause of this belief is the manner in which fixed costs have been understood to enter into production and what aspect of resource usage is being measured by accounting numbers. The received wisdom on conventional accounting practice is that, when output is produced using a fixed resource, the pr can be represented by a relation of type 2(a) where I_1 signifies the bundle of variable inputs and I_2 some part of the fixed resource which is thereby 'used up'

in the production process. Much research effort has been expended on examining the cost allocations which have tried to capture this usage property and there is now a strong body of opinion that, except under very special conditions, they are arbitrary.

Number assignments which are arbitrary except under special conditions would obviously be unacceptable in a theory attempting to explain how conventional accounting measurement provides empirically meaningful numbers under general conditions. Transactions theory avoids this impasse by getting away from the idea that accounting measurement tries to assess *directly* the amount of the total value of fixed resources 'used up' in production. The alternative explanatory route taken by transaction theory relies upon interpreting prs in which fixed resources are involved as being of the separable 2(b) type rather than the 2(a) type and this in turn depends upon a distinctly physical interpretation of the way in which fixed resources enter and leave production processes. With a little embellishment the Dyer Corporation data borrowed from Tippett (1978) in previous illustrations in Willett (1987) can be usefully employed to explain this point of interpretation.

Assume that Dyer's opening inventory (at 1 January 1909) of £10,000 consisted of 1000 items it is known did actually cost £10 per unit and that the 800 units sold for £20 per unit on 28 February 1909 are from these items. In a sense (the sense used by writers such as Thomas in the literature cited) this process may be perceived as being joint with the use of fixed resources such as, in the Dyer case, the buildings in which production takes place. Hence it is possible to interpret the process producing the 800 units as being of type 2(a) where the 800 units of inventory purchased are denoted by I_1 , the buildings 'used up' by I_2 and the 800 units sold by O . As traditionally perceived it is then required to rationalise how much of the depreci-

ation charge on the buildings should be allocated to the cost of the inventory sold so as to arrive at an income measure which directly represents some empirical attribute of interest. The problem then appears to be: what does a number of the form $\pounds[800(20 - 10) - X]$ —where X is some fraction of the cost or other value of the buildings—represent in the real world?

In transactions theory two tiers of analysis are adopted to explain the number assignments which take place in conventional accounting in instances like the one in this example. The axiomatic framework under consideration lays down the conditions under which costs can be meaningfully allocated to economic activities and leaves aside calculations like depreciation to be explained in a quite different manner as derived statistical calculations which average costs with respect to time. Both tiers, however, depend on a viewpoint of separability in production processes involving fixed resources which is different from that usually taken. It amounts to interpreting the production process of the illustration in terms of a type 2(b) pr rather than a type 2(a) pr with I_1 and I_2 representing the same resource sets as before but with O_1 now denoting the 800 units sold and O_2 separately representing the buildings held after 28 February 1909. Under this interpretation I_2 can loosely be said to be equal to O_2 , a circumstance which allows the whole process of buying and selling 800 items of inventory to be seen as two separate processes: one relating the variable inputs to the outputs (i.e. $I_1 \rightarrow O_1$), the other relating the holding of the buildings at two points in time (i.e. $I_2 \rightarrow O_2$). The separate costing of variable inputs and fixed overheads could not be justified without incorporating properties similar to these into production structures. Some aspects of the treatment of fixed resources are discussed further in section 3 (see particularly footnote 7).

The second problem referred to immediately before the beginning of this subsection, which inevitably crops up in the practical application of accounting measurement, is frequently and misleadingly confused with the joint product problem just discussed. It is the following: a production relation of type 2(b) exists and separates to type 2(c), but $I_1 \cup I_2$ has a composite cost and the individual costs of subsets of $I_1 \cup I_2$ are not known. This situation can arise for a number of reasons. The most probable cause is the absence of agreement between the entities to the transaction in $I_1 \cup I_2$ as to how much debt relates to each element in the set, but the same problem would exist even if such measurements were taken and later lost, or, as is commonly the case with the cost of inventories, not recorded in sufficient detail. An example of this would be where the 1000 units of inventory purchased by Dyer cost $\pounds 10,000$ in total but the individual costs were not known. If such a condi-

tion subsists then it is only possible to measure the cost of type 2(c) relations with *certainty* if they are treated as though they were joint. In Dyer's case this would necessitate holding the revenues received from the sale of the 800 items sold in suspense against the cost of the inputs without recognising profit until such time as the remaining 200 units were sold. Of course, in practice accountants usually resort to estimates of the actual costs suffered under these circumstances with the only constraint on these estimates being that the parts must sum to the whole (a constraint which is implied, incidentally, in the theory of a cost structure). It is significant in appreciating the application of transactions theory to the interpretation of financial calculations that it in no way prohibits such practices. What simply happens is that whenever estimates of unknown costs in separable processes are made an *inherent uncertainty* of a statistical nature will be introduced into the accounting measurement process.

The twin topics of inherent uncertainty in practical accounting measurement and the irrelevance of joint product costing in performance assessment discussed above have been highlighted because they seem, from previous experience, to arouse unrealistic preconceptions in the minds of many opponents of conventional accounting techniques as to what these techniques are trying to achieve.

In the case of uncertainty this preconception is that estimates which 'allocate' costs to production activities should be justified by reference to an attribute which they directly represent. The answer to this expectation in transactions theory is: the 'allocation' (e.g. FIFO) is not the direct measurement of an attribute of anything but is a derived estimate and may be judged by its statistical characteristics.⁴

In the case of joint product costing the preconception is that conventional accounting performance measurement *does* attempt to cost joint

⁴Limitations of space prevent an extended discussion of this point here. The basic idea is that an estimated cost will be drawn from a range of possible values and the particular method of estimation adopted will feed into whatever derived measure is calculated and will thus indirectly affect the statistical characteristics of the latter. No attempt is made to quantify the uncertainty resulting from this problem in the axioms of the theory developed in section 3 because it is a descriptive model of conventional financial statement arithmetic and the measurement of uncertainty plays no explicit role in this. Ijiri attempted partially to overcome the estimation hurdle by including an average costing axiom for units of resource (1975, pp. 74-9) although there was no analogous axiom in the case of different resource classes. For this to be a realistic axiom, however, the technique of average costing would have to have the much stronger status of a social convention which it certainly lacks at present. On the whole it seems safer currently to leave such estimation techniques outside the scope of an axiomatic treatment of the accounting measurement process itself and to analyse the statistical problem in a derived measurement context.

products separately and therefore that a justification of this practice is needed. Hence, the argument goes, since everybody knows this to be a nonsense, conventional accounting must be a hotchpotch of techniques and any attempt to build a consistent theory of it is doomed to failure. This supposition confuses the *measurement* of financial data with its *disclosure*. The fact that an apparently endless list of mathematical operations on the basic data contained in financial statements have been suggested in the accounting literature is evidence of the hotchpotch of *purposes* for which the financial information disclosed is used, not that the measurement data is itself arbitrary or meaningless.

The present theory thus prevents the separation of costs in joint product processes but allows the breakdown of composite costs by the use of a statistical procedure. The justification for this distinction is that when production processes are separable but actual cost measurements are composite a controllable decision variable exists (for example, that of increasing or decreasing levels of activity in the separate processes) and a course of action is available to decision makers to affect their performance. It is therefore open to decision makers in such circumstances to gamble upon making a good estimate of the separate costs of each process. In the case of joint product processes a similar decision variable does not exist as it is *not* possible independently to control the physical activity levels of the products concerned. In consequence there is no separate physical process to measure, no accurate estimate to guess and no sensible decision to take.⁵

The preceding analysis is, of course, well known to the student of management accounting. Nevertheless it serves both to tie in the fundamentals of financial accounting theory to management accounting philosophy and also to emphasise the informational limitations necessarily present in conventional accounting as it is applied to the real

world. Apart from explicit consideration of these themes many of the ideas developed rigorously in the next section naturally arise in transaction based interpretations of the accounting process. In essence they are derivative, being similar to those of Littleton (1953, 1970) and to other related concepts which occasionally surface in the income theory branch of the literature (e.g. Penman, 1978). The prime reason why these theories have failed to be sufficiently persuasive in the past is that they have slipped too often into using valuation approach concepts in order to make sense of the accountant's practice of matching (see, for example Paton and Littleton's (1940) discussion of production functions as 'price aggregates'). The result has been implicit or explicit reliance upon the kind of untenable hypotheses concerning uncertainty and joint products discussed above which inevitably fail to deal with the problems identified by Thomas in the literature cited earlier. The axiomatic theory discussed in the following section is designed to circumvent this eventuality and describes in a more rigorous and general manner how the considerations outlined above relating to the meaningful allocation of costs to activities can be characterised in a formal explanation of accounting.

⁵The 'activities' referred to in the text are meant to be understood as what might be called 'smallest controllable activities'. Examples of such activities are those in which the revenues of units of production are compared to their variable costs; overhead activities such as stationery purchased; and the acquisition and holding of identifiable items of equipment. Information about activities of this type is relevant to product mix decisions and to whether or not it is worth continuing to produce a particular product. In many production decisions this information will be judged in the aggregate, in combination with contribution data from many different activities (as, for instance, in a decision to close a branch or a factory and in decisions of the make-or-buy type). The reasoning used in these contexts is exactly the kind of analysis found in management accounting texts such as Horngren and Foster (1987). Kaplan (1984) contains some interesting historical information relating to these matters.

Table A

Axioms for a production structure

$\langle zP^u, z \rightarrow \rangle$ is a 'production structure with respect to Z in u ' iff the following axioms hold for all $(A_i, T_i), (A_j, T_j) \in zP^u$:

1. If $(A_i, T_i) z \rightarrow (A_j, T_j)$ then $T_j = T_i + 1/2$.
2. If $(A_i, T_i), (A_j, T_j) \in zP^u$ where $T_i < T_j$ then $(A_i, T_i + 1/2) \in zP^u$ exists such that $(A_i, T_i) z \rightarrow (A_i, T_i + 1/2)$.
3. Either $(A_i, T_i) z \rightarrow (A_j, T_j)$ is separable or it is joint.
4. If $(A_i, T_i) z \rightarrow (A_j, T_j)$ is separable into $(^1A_i, T_i) z \rightarrow (^1A_j, T_j)$ then $(^2A_i, T_i) z \rightarrow (^2A_j, T_j)$.

Completeness Axioms

1. If $(\{a_i\}, T_i) \in zP^u$ then $(\{z\}, \{y_i\}, \{a_i\}, [T_i, T_i + 1]) \in F$ for all $T_i, T_i + 1 \in u$.
2. If $(\{a_i\}, T_i) \in zP^u$ and not $(\{a_i\}, T_i) \in zP^u$, where $v \subset u$ then $(\{z\}, \{y_i\}, \{a_i\}, [T_i, T_i + 1]) \equiv \emptyset$ for all $T_i, T_i + 1 \in v$.
3. If C_i is debited $X_i = Z$ and $t_i = u$ then $(\{a_i\}, T_i) \in zP^u$, for some $a_i \in A_i, T_i \in u$.
4. If $C_i \in F$ then $(\{z\}, \{y_i\}, \{a_i\}, [T_i, T_i + 1]) \in F$ for all $T_i, T_i + 1 \in t_i$.

Asset and equity accounting

The objective of this third section is to provide details of eight axioms describing the assumptions accountants make when constructing financial statements. Four of these axioms model the accountant's understanding of the physical relationships which exist in the production of economic goods and services. These are based upon the ideas discussed in the previous section. The remaining four axioms are 'completeness' axioms similar in function to those found in the literature on the theory of value. However, the completeness axioms of cost theory are weaker than their value theory analogues and more realistic. Taken together with a cost structure denominated in an arbitrary currency the axioms and appropriate definitions based on them logically justify the arithmetic in Figure 1 while also providing it with direct empirical meaning.

Tables A and B contain a summary of the axioms and definitions referred to, and the rest of this section will be devoted to explaining what the hieroglyphics mean and how they relate to the preceding analysis. Both Tables should be taken in conjunction with the definitions given in the previous article. zP^u is a set of ordered pairs of the type (A_i, T_i) , the first element being a resource set and the second a point in time in the interval u . The relation defined on this set, $z \rightarrow$, is meant to capture the idea of resources at one point in time producing resources at a later time. Thus $(A_i, T_i) z \rightarrow (A_j, T_j)$ is interpreted as 'some member z of entity Z uses resource set A_i at T_i to produce resource set A_j at T_j ' where it is understood that T_i and T_j are both contained in the interval u . The axioms for a production structure provide this relation with properties sufficient to allow the construction of a further 'matching' relation (discussed below) which in turn enables the partitioning of resource sets into equivalence classes of economic activities during a given time interval.

The properties needed to partition resources into economic activities in order to make sense of accounting performance measurement were discussed informally in the last section. In applying an axiomatic approach to the rather vague notions developed there, these have to be made more rigorous, operational and general. The major problem in describing the production process is how to incorporate both the resource and time factors together in a sensible fashion.

The basic method of solution adopted is to take the properties suggested by the relationships illustrated in Figure 2 and to treat these as existing between resource sets identified at arbitrarily close points in time. By adding adjacent discrete happenings (in time) together a more complex chain of

activity is obtained. This 'atomic' interpretation of production processes allows economic systems of arbitrary complexity to be modelled. A diagrammatic illustration of this principle is contained in Figure 3.

The abscissa in Figure 3 shows integer units of time. The ordinate shows discrete elements of the resource set arranged for the convenience of illustrating the flow of the production relation—no other properties are presumed in the interpretation of this axis. Three activities are shown: $[A_1]^{[0,3]}$, $[A_{10}]^{[0,3]}$ and $[A_{11}]^{[0,3]}$. The idea is to use the fact that a sequence of prs exists joining, say, $(A_1, 0)$ to $(A_9, 3)$ to justify the assertion that A_1 and A_9 are in the same equivalence class, i.e. 'physical activity'. Roughly speaking, a qualifying production sequence in this case is: $(A_1, 0)z \rightarrow (A_3, 1)$; $(A_3, 1)z \rightarrow (A_5, 2)$; $(A_5, 2)z \rightarrow (A_9, 3)$. However there are others, as can be observed from the continuous lines joining the elements of $[A_1]^{[0,3]}$.

$[A_1]^{[0,3]} = \{A_1, A_2, \dots, A_9\}$ and it is in this sense that these resource sets are matched to each other (e.g. $A_1[0,3] \sim A_9$). It can also be seen how the costs of these activities will be classified as assets and equities on the basis of their being unfinished or finished respectively at definite points in time. The cost of $[A_1]^{[0,3]}$ is an asset at 3 while the costs incurred in both $[A_{10}]^{[0,3]}$ and $[A_{11}]^{[0,3]}$ are equities at 3.

Formally, then, the axioms of a production structure have to describe a system of properties expressed as set theoretic predicates so that the partitioning just described graphically can be accomplished.

Axiom 1 in Table A simply states that the primitive pr between resource sets is defined over some arbitrarily small interval of time and can only proceed from the past to the future. The latter aspect of prs is perfectly obvious and undeniable but has to be stated explicitly for the purpose of logical analysis. Without this property, even with perfect knowledge, it would be impossible finally and conclusively to measure any process in a given time interval for, having established the content of an activity up to time T , the measurer could later find that, at T , still other resources had found their way into the same production process.

Axiom 2 states that, if a resource is held by an entity over a certain time interval, it is held at every point in that interval. This directly implies that, should the same resource set exist at two distinct points in time, it will always be possible to discover a sequence of prs joining the resource sets. Hence, in the interval u , as far as Z is concerned, if A_i exists at T_i (i.e. if $(A_i, T_i) \in zP^u$) and if A_i also exists at a later time in u , say, $T_i + n$, then an accountant will be able to find an $(A_i, T_i + r)$ for every r from $2r = 0$ to $2n - 1$ such that $(A_i, T_i + r)z \rightarrow (A_i, T_i + r + \frac{1}{2})$. Again it might seem that this is stating the obvious and it is, as

Table B**Definitions of terms and statement of theorems****Definitions**

$z \rightarrow$ is a binary (production) relation on the elements of $A \times T$ where A is the universal resource set and T represents a set of the endpoints of arbitrarily small consecutive intervals in time and the half intervals between them.

$zP^u = \{(A_i, T_i) | (A_i, T_i) \in A \times T \text{ and some } (A_j, T_j) \text{ exists such that } T_i, T_j \in u \text{ and either } (A_i, T_i)z \rightarrow (A_j, T_j) \text{ or } (A_j, T_j)z \rightarrow (A_i, T_i)\}$

z, y_i, a_i are arbitrary elements in Z, Y_i and A_i respectively.

${}^1A_i \cup {}^2A_i = A_i; {}^1A_i \cap {}^2A_i = \emptyset; {}^1A_i \subset {}^1A_i; {}^1A_i \subset {}^2A_i.$

Separability:

$(A_i, T_i)z \rightarrow (A_j, T_j)$ is 'separable into $({}^1A_i, T_i)z \rightarrow ({}^1A_j, T_j)$ ' iff $({}^1A_i, T_i)z \rightarrow ({}^1A_j, T_j)$ exists and neither of the following exist: $({}^{11}A_i, T_i)z \rightarrow ({}^{12}A_j, T_j)$ or $({}^{12}A_i, T_i)z \rightarrow ({}^{11}A_j, T_j)$

Jointness:

$(A_i, T_i)z \rightarrow (A_j, T_j)$ is 'joint' iff either no ${}^1A_i, {}^1A_j$ exist or $({}^1A_i, T_i)z \rightarrow (A_j, T_j)$ or $(A_i, T_i)z \rightarrow ({}^1A_j, T_j)$ for all ${}^1A_i, {}^1A_j.$

All the following definitions are given with respect to an arbitrary accounting entity Z , so that zP^u and $z \rightarrow$ may be written P^u and \rightarrow respectively:

Matching:

$A_i u \sim A_j$ (A_i is 'matched in u to' A_j) iff there is a finite, not necessarily distinct, sequence $(A_0, T_0), (A_1, T_1), \dots, (A_n, T_n) \in P^u$ such that $A_0 = A_i, A_n = A_j$ and either $(A_x, T_x) \rightarrow (A_{x+1}, T_{x+1})$ or $(A_{x+1}, T_{x+1}) \rightarrow (A_x, T_x)$ for $x = 0$ to $n - 1$.

$[A_i]^u \in A/u \sim$ is called an 'activity in u '

$\{[a_i]\}^u$ is called a 'prime activity in u '

Let $m \in N$ be arbitrary points of time in $[0, T)$ such that m is before $m + 1$:

${}^aA^m$ is the union of all prime activities in $[0, m)$ containing a resource set A_i such that $(A_i, T_i) \in P^{[0, m+1)}$ and $T_i = m + 1$.

${}^eA^m$ is the union of all prime activities in $[0, m)$ containing no resource set A_i such that $(A_i, T_i) \in P^{[0, m+1)}$ and $T_i = m + 1$.

${}^eA^{21} = {}^eA^2 - {}^eA^1; {}^aA^{12} = {}^aA^1 - {}^aA^2.$

The following costs are all assumed to have a first component of Z and a second of X :

$({}^aA^1, [0, 1))$ = 'assets at 1'

$({}^eA^1, [0, 1))$ = 'equities at 1'

$({}^fA^1, [0, 1))$ = 'funds at 1'

$({}^fA^2, [1, 2))$ = 'changes in funds in $[1, 2)$ '

$({}^eA^{21}, [0, 2))$ = 'retained profits in $[1, 2)$ '

$({}^eA^{12}, [0, 1))$ = 'opening assets consumed in $[1, 2)$ '

For all costs it is assumed that the T'_i and T''_i in $[T'_i, T''_i)$ are integers.

Theorems**Balance sheet identity:**

$$\alpha({}^eA^1, [0, 1)) + \alpha({}^eA^1, [0, 1)) = -\alpha({}^fA^1, [0, 1))$$

Changes in funds identity:

$$\alpha({}^fA^1, [0, 1)) + \alpha({}^fA^2, [1, 2)) = \alpha({}^fA^2, [0, 2))$$

Capital maintenance identity:

$$\alpha({}^eA^1, [0, 1)) + \alpha({}^eA^{21}, [0, 2)) = \alpha({}^eA^2, [0, 2))$$

Profit and loss account identity:

$$\alpha({}^eA^{21}, [0, 2)) = \alpha({}^eA^1, [0, 1)) + \alpha({}^fA^2, [1, 2)) - \alpha({}^eA^2, [0, 2))$$

Source and application of funds identity:

$$\alpha({}^fA^2, [1, 2)) = \alpha({}^eA^{21}, [0, 2)) + \alpha({}^eA^2, [1, 2)) - \alpha({}^eA^{12}, [0, 1))$$

Changes in assets identity:

$$\alpha({}^eA^2, [0, 2)) = \alpha({}^eA^1, [0, 1)) + \alpha({}^eA^2, [1, 2)) - \alpha({}^eA^{12}, [0, 1))$$

long as care is taken in interpreting the empirical meaning of the resource set.⁶

Axiom 3 states that a pr is either separable or joint. With the relevant definitions this gives effect to the concept of separability outlined in the third section. The notion of the separability of a pr is formally defined in Table B along with the related concept of jointness. The underlying ideas of these definitions are illustrated in Figure 4. Pr1 is separable into $pr1(a) = ({}^1A_i, T_1)z \rightarrow ({}^1A_j, T_2)$ because $pr1(a)$ exists and because no prs exist between the resource subsets of $pr1(a)$ and those of $pr1(b)$. Pr2 is joint because a pr exists between every singleton subset of its relevant resource sets (this is a fairly direct implication of the definition and axiom 3). This latter property reflects the fact that in joint processes it is not possible to discern which part of the earlier resource set causes which part of the later resource set. Axiom 3 is, in effect, a rule for decomposing activities.

⁶The construction of the resource set was discussed only briefly in Willett (1987) with a few examples given of what was meant by the term. Without further explanation at this stage this would probably prove insufficient to avoid the risk of disagreement on matters of its interpretation in the context of these further axioms.

Principally it should be emphasised that the universal resource set A cannot be interpreted as consisting simply of physical commodities (objects) and services (events). If it were to be so interpreted Axiom 2 could lead to conclusions inconsistent with conventional practice. For suppose A_i was sold by X_i to Y_i and later repurchased. If A_i was interpreted on purely physical criteria then, from X_i 's point of view, A_i would still be part of the same activity after repurchase as it was prior to the earlier sale. This might lead to the embarrassing conclusion that the costs of activities which were classed as equities at one accounting date should be reclassified as assets at a later accounting date.

The way around this problem is to insist that an entity which sells a physical thing and later repurchases (or hires) it, treats it as a distinct resource set before and after the sale because the entity's rights in it are changed by the transaction. This amounts to construing the resources set A as a product set $B \times R$ where B is a set of physical goods and services and R is a set of rights. The only role played by rights in this theory, therefore, is to distinguish otherwise indistinguishable physical resources from one another.

In terms of axiom 2 the effect of the rights concept may be illustrated as follows: if B_i is a machine built by X_i which it then sells to Y_i at T_i and later repurchases as a fixed asset at $T_i + n$ it is enough to be able to recognise that the rights in B_i in some time interval up to T_i are different (because of the break in ownership) from those subsisting in B_i in some interval after $T_i + n$. Thus using distinct integers to represent different rights, the earlier possession of B_i can be denoted as $A_1 = (B_i, 1)$ and the latter as $A_2 = (B_i, 2)$. As $A_1 \neq A_2$ there is not necessarily any production sequence, by virtue of axiom 2, between (A_1, T_i) and $(A_2, T_i + n)$.

It might be revealing to study the relationship between physical things and rights (Mattessich, 1964, pp. 448–65, made some attempt to do this) but that matter will not be developed any further here. It is adequate to think of R as a set of integers indexing each physical resource set to reflect its transactions history. The system of axioms used in Table A does not make explicit use of the rights set and it does not seem necessary to complicate the notation and ideas any further by substituting $B \times R$ for A. These considerations will therefore be left implicit but should be borne in mind in matters of interpretation.

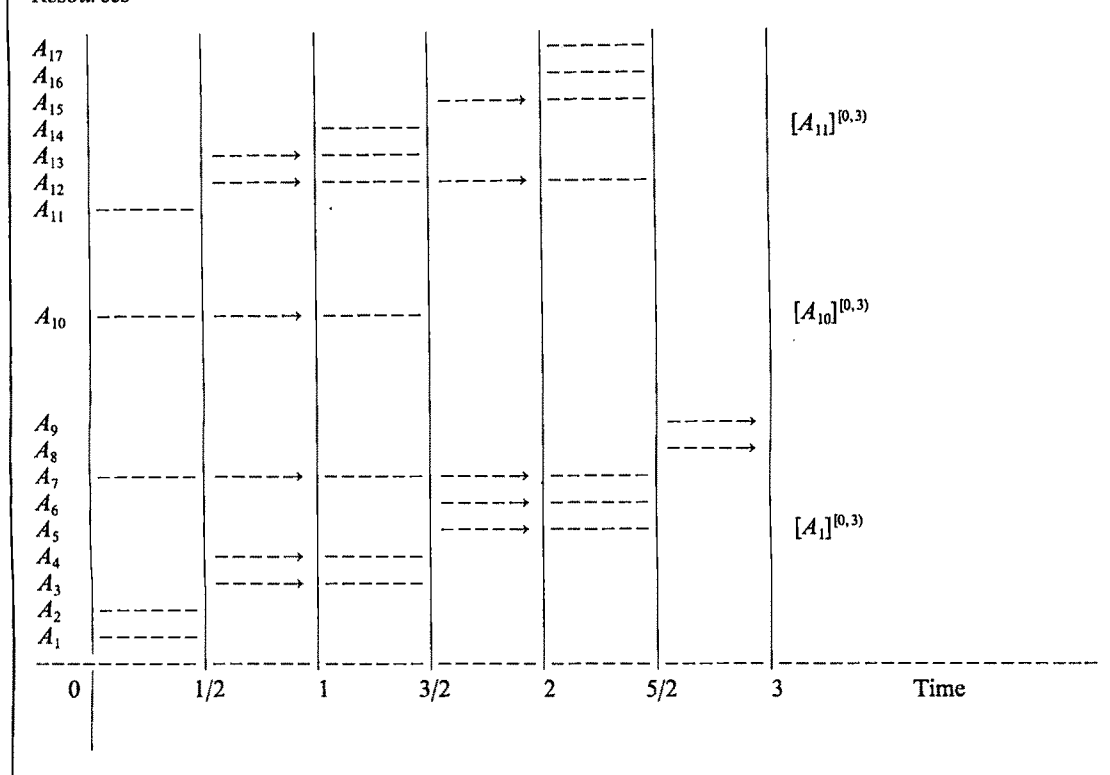
Axiom 4 states that if a smaller pr is contained within a larger one the remaining input and output resources are also related together in production. Like axiom 3 it is a decomposition axiom. Axioms 3 and 4 assure the measurer of finding some smaller pr within a larger one subject only to the existence of minimum elements in A. If a pr is joint every element in the relevant resource sets is connected in production with each other. Alternatively if it is initially known only that pr1 separates to pr1(a) then the axiom ensures pr1 also separates to pr1(b). This is precisely the property which allows the costing of fixed assets separately from the comparisons of saleable outputs with variable input costs. For example, in Figure 4 1A_i could be the set of variable inputs (say, materials and labour) and 2A_i the fixed equipment necessary to produce the saleable output 1A_j . Then 2A_j could be the equipment after the output has been produced. Axiom 4 enables the measurer to treat pr1(a) and pr1(b) as separate activities if, on the facts of the case, this appears reasonable.⁷

The theoretical development proceeds by showing how a matching relation corresponding to the accountant's practice of aggregating costs into economic activities can be defined (see Table B) and demonstrated to be an equivalence relation. It can then be shown, by using the decomposition axioms, how minimum activities ('primes') exist which actually partition the resource set itself, rather than just the power set of A. The material characteristic of primes is that every singleton subset of a resource set used in production is connected by the matching relation to every other such subset. Every prime is therefore either 'unfinished' at an arbitrary point in time T_i (i.e. contains a pr in which T_i is a term) or 'finished' (the contrary state) but not both. Hence this can be used to give effect to the idea, outlined in the second section, that costs incurred in aggregated unfinished primes at any stated point in time are 'assets' at that time and those incurred in any other aggregated primes at the same time are 'equities' (the latter thus being economic activities which are wholly complete at the balance sheet date).

Figure 5 illustrates visually what the foregoing entails in the way of classifying economic activity over time. The product set $A \times T$ can be divided

⁷Essentially, the strategy adopted in interpreting the concept of fixed resources is that they are viewed as remaining, for practical purposes, physically unchanged by each small step in the production process and that, therefore, they can be treated as entering a pr at one end and reappearing at the other. This, of course, is an approximation or simplification of reality which is more or less true depending upon actual circumstances. As long as it is approximately true, information relevant to the long term usage of the fixed resource can be provided statistically by the depreciation calculation. To the extent that an asset is substantially used up in a pr and obviously does physically change in the process the decomposition rules outlined in the text do not apply and the pr might, in that case, be joint.

Figure 3
Resources



into various parts ('boxes') corresponding to the major financial statement identities defined in Figure 1 and at the foot of Table B.

As with Figure 3 the ordinate simply lists distinct elements of the resource set and does not imply any stronger arithmetic properties. The arrowed lines indicate pictorially that the resources relating to the box containing the arrows are 'used' in a pr during some time interval covered by the extent of the line.

There are ten significant accounting categories within $A \times T$: five on the resource coordinate and two on the time coordinate. Those resources in activities finished at 1 are denoted ${}^eA^1$. Resources in activities begun before 1 and finished afterwards are denoted ${}^aA^1$. The notation is similar for resources with analogous characteristics at 2. By definition ${}^fA^1$ is set equal to ${}^aA^1 \cup {}^eA^1$ and likewise for ${}^fA^2$.

The other aggregated subsets of A which are important in the definitions of the major accounting concepts are the following:

${}^aA^{12}$ = resources used in activities started and unfinished at 1 but finished at 2, i.e. ${}^aA^{12} = {}^aA^1 - {}^aA^2$.

${}^eA^{21}$ = resources used in activities finished at 2 and either unfinished or not started at 1, i.e. ${}^eA^{21} = {}^eA^2 - {}^eA^1$.

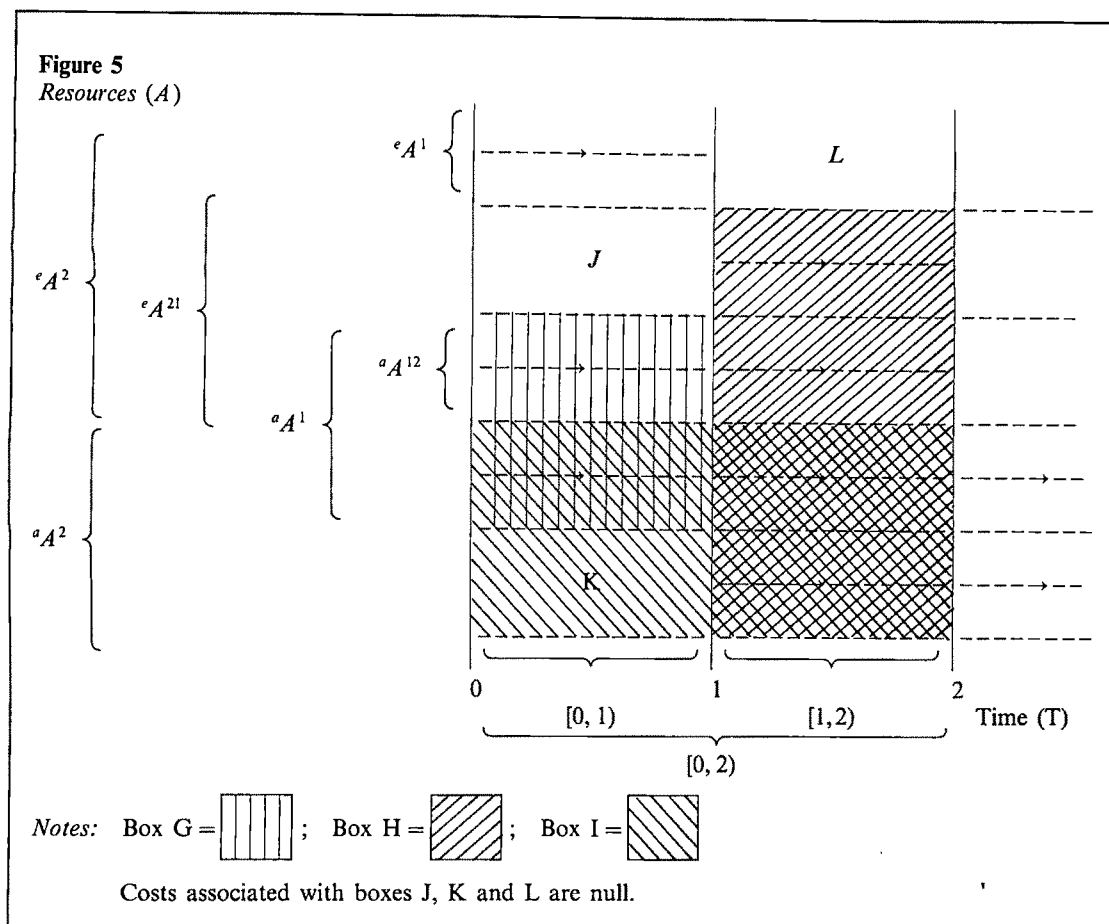
The definitions of accounting concepts in Table B demonstrate that all the principal accounting identities described in Figure 1 can be characterised as the cost of special resource sets and hence directly represented in terms of objectively defined set theoretical predicates.⁸ In partic-

Figure 4

Interpretation of $\text{pr}(A_i, T_1)z \rightarrow (A_j, T_2)$ as separable or joint:

	T_1		T_2
<i>Separable activity pr1:</i>			
pr1	A_i	$z \rightarrow$	A_j
<i>Separates to:</i>			
pr1(a)	1A_i	$z \rightarrow$	1A_j
pr1(b)	2A_i	$z \rightarrow$	2A_j
<i>Joint activity pr2:</i>			
	A_i	$z \rightarrow$	A_j
	$\{a_1\}$	$z \rightarrow$	A_j
	$\{a_2\}$	$z \rightarrow$	A_j
	\vdots	\vdots	\vdots
	$\{a_n\}$	$z \rightarrow$	A_j

⁸Thus $({}^aA^{12}, [0, 1))$ is the cost of assets at 1 consumed during $[1, 2)$ and $({}^eA^{21}, [0, 2))$ is the retained pure cost profit in $[1, 2)$ before any provision adjustments are made.



ular the retained pure cost profit of X_i in the accounting period $[T', T'']$ before provision adjustments is defined as 'the costs of X_i with the entity set X incurred in $[0, T'']$ in the activities of any member of X_i finished at T'' and either unfinished or not started at T'' '.

The theorems in Table B are consequences of the preceding axioms, the definitions just described and the additional 'completeness' axioms described in Table A.

Completeness axiom 1 states that should any resource set, no matter how small, be used in production then the debt so created is measurable in the sense that it is either of positive, negative or zero value.⁹ In other words if an accountant can find, after a reasonable amount of inquiry, that the cost associated with something used in production is neither debited nor credited, then it can safely be concluded that the monetary cost is zero. Visually, in terms of Figure 5, this means that every point on the graph can be mapped to the integers.

Completeness axiom 2 states that the cost of a resource not used in production (which also excludes the possibility of an exchange) must be zero. The purpose of this axiom is to cover the case where a resource, active at some time in the past, has not been used in production during a given interval. If

this is the case any cost during that interval is measurable but must be set equal to zero. This allows costs to be carried forward as balances if necessary. Boxes J, K and L in Figure 5 indicate the effect this has on the graphical representation: any cost pertaining to a point in these areas, where no activity has taken place, will be null.¹⁰

Axiom 3 states that if a non-zero debt has been created then some resource set included in its resource component must have been used in some economic activity at some time during the interval to which the cost relates. This relates to the converse situation covered by completeness axioms 1 and 2. It follows from completeness axioms 2 and 3 that it is not possible both to assert that an 'atomic' cost c_i (i.e. a cost with only indivisible components) is debited or credited and also to deny that its resource component $\{a_i\}$ is used in production in the interval described by its time component $[T'_i, T'_i + 1)$.

Lastly, *completeness axiom 4* states that all costs

⁹The set F was defined in Table B in Willett (1987).

¹⁰Hence, for example, it can be deduced that $\alpha(X_i, X, A^1, [1, 2]) = £0$ and therefore that $\alpha(X_i, X, A^1, [0, 2]) = \alpha(X_i, X, A^1, [0, 1])$. This result is, incidentally, necessary to prove the capital maintenance identity.

contained within a measured cost are themselves measurable. This condition ensures the existence of sufficient measurable costs to enable arbitrary, measured costs in a set of financial statements to be aggregated according to the cost representation theorem in Part I.

The completeness axioms play a role of relating cost structures and production structures as well as ensuring that there are sufficient zero costs in existence to allow an accounting to take place. In another, more practical, sense the completeness axioms reflect the two common habits that accountants have of always relating debts to some activity (e.g. charges to the overhead activity of 'general expenses') and of setting the costs of activities at zero if there is no evidence of positive or negative indebtedness.

Turning finally to the theorems in Table B, the meaning of these and the purpose of defining assets and equities in the manner described should be readily understandable in the context of the ten time-related resource set 'boxes' represented in Figure 5. The balance sheet identity, for example, is easy to prove. For any Z at time 1, $((^aA^1, [0, 1)), (^eA^1, [0, 1))) \in K$ (omitting for convenience the constant components of cost) because $^aA^1 \cap ^eA^1 = \emptyset$. As, by definition, $^aA^1 \cup ^eA^1 = ^fA^1$ the balance sheet identity follows immediately using the cost structure representation theorem in Willett (1987, p 157). Naturally the same position holds at time 2 also. In a likewise fashion the funds identity can be deduced using the additional result that $^fA^1 \subset ^fA^2$ and the property supplied by completeness axiom 2.

All of the theorems in Table C and their method of proof can be intuitively understood in the context of Figure 5. It is simply necessary to use the visual rule that the costs of the various boxes are additive (in the sense of the cost structure representation theorem) with any other box with which they share a common side. Hence, to prove any of the theorems it is a matter of establishing that some procedure exists for equating the boxes represented by one concept, e.g. retained profits, to the concepts relating to the other side of the relevant identity, e.g. the profit and loss account identity. In the case of the example just mentioned (again omitting the constant components of cost) it is apparent that the box $(^eA^2, [0, 2))$ can be found by adding box G, the cost of assets at 1, first to J and K (which are null), then to box H (the sales and purchases in $[1, 2))$ and finally by subtracting box I (the cost of assets at 2). The reader may recognise this as the 'cost of sales' calculation.

Discussion and conclusion

The axiomatic theory contained in this paper demonstrates how the values of non-monetary

assets and profits before provision adjustments can be interpreted as an empirical partitioning of the total cost set into unfinished and finished physical activities respectively. It is a theory of matching and as such provides a solution to problem (iii) left over from the Part I article (Willett, 1987, p 163).

Taken in conjunction with the axioms of a cost structure matching theory shows how it can make arithmetic sense, *when sufficient information concerning the actual costs incurred in physical activities is available*, to measure separately such things as the variable cost of sales in the profit and loss account and the total cost of non-monetary assets in the balance sheet. Axiomatic transaction theory as a whole justifies the principle of dividing up the total cost of a firm of any size between the separable economic activities in which it is engaged, to give a representation of the form:

$$C = n_1 \cdot C(1)/n_1 + n_2 \cdot C(2)/n_2 + \dots \quad (4)$$

where: C is the cost of a collection of resources used in a single activity, n_a is the number of units of a , for $a = 1, 2, \dots$, $C(a)$ is the cost of a collection of n_a units of $a = 1, 2, \dots$

Assuming the measurements are accurate, this representation of a separable activity is tautologically true, given the axioms of the present theory, under any market conditions. $C(a)/n_a$ is an average unit cost and exists simply by virtue of the fact that $C(a)$ and n_a are either known or themselves estimated. In other words there is no presumption in using transaction theory to measure economic performance either about any special characteristics which markets might have or about the rationality of decision makers. The representation of activity costs in (4) is significant because it always exists in monetary economies, is measurable and provides information about actual occurrences of economic events. As a consequence it is possible to use empirical realisations of expression (4) to investigate whether, in fact, the activity costs of given entities actually do exhibit any discernible systematic behaviour patterns and, if so, to apply scientific analysis to understand them. However the most any measurement can do on its own is provide an input into the behavioural model concerned, it cannot itself explain or predict anything about economic systems as such. The latter problem is outside the domain of measurement theory and therefore outside the scope of this essay.

But what of the fourth problem stated in the previous article? What sort of interpretation does transactions theory provide of provision accounting and, in particular, of depreciation accounting?

As the discussion in section 2 revealed, transactions theory deals with this problem by reclassifying as conceptually distinct certain problems of accounting measurement which have lately been

considered by some schools of thought (under the influence of Thomas) to be one and the same. Hence the matching of costs in inventory valuation and the calculations taking place in depreciation accounting are seen as fundamentally different measurement processes in transactions theory. Neither depreciation accounting nor any other forms of provision calculations are interpreted as instances of matching in the way in which inventory costing and the cost of sales calculation are.

As a matter of descriptive fact provision accounting calculations such as depreciation involve making arithmetic transformations of the representation of activity costs shown in (4) using estimates of activity durations (i.e. 'expected useful lives of assets') and residual values. Since, as was also observed earlier in the case of the underlying activity costing, the amount of information necessary in practice to achieve objective certainty will almost inevitably be lacking, it is clear that in order to apply transactions theory in a realistic setting the vast majority of accounting calculations must be interpreted as stochastic variables. The effectiveness of transactions theory is that it does allow an easy and sensible statistical interpretation of this kind to be made of accounting calculations such as historic cost profit, net book values of fixed assets, cash flows and in fact any number incorporating costs and other clearly defined measurements in its derivation. It therefore provides a framework within which the empirical significance of different derived accounting measurements such as those mentioned can be evaluated. It is not possible to develop the detail of this point here but the example of historic cost profit will suffice to illustrate its essential force.

In conventional practice the most common form of the historic cost profit (which can be denoted for brevity by h) is defined by a method of calculation which involves aggregating, for a specific entity, the costs incurred in activities taking place in an accounting period $[T_{i-1}, T_i]$ after averaging 'long term' activities with respect to time (as for instance in the depreciation calculation). In the broader context of a firm's history the value of h is determined stochastically depending on seven major variables which may be expressed in functional form as:

$$h = \sum_j f_j(c_j, s_j, d_j, N_j, T_{i-1}, T_i) \quad \text{for } j = 1 \text{ to } m \quad (5)$$

Here, c_j, s_j, d_j are random variables denoting in turn the total activity cost, start time and duration time of the j^{th} activity and N_j, T_{i-1}, T_i are parameters standing for the number of j^{th} activities entered into during the entity's lifetime, the opening balance sheet date and the closing balance sheet date respectively.

It is somewhat complicated, but not intractably so, to derive formulae for the computation of h based on different assumptions concerning the depreciation method used, the recognition of profits on long term contracts, etc. The extent to which mathematical methods can be used to make realistic inferences about the general characteristics of the statistical form of h shown in (5) is unclear but some initial simulation experiments seem to confirm the potential of this model for exploring the sampling distribution of h under various scenarios. This raises the possibility that the transactions approach to understanding accounting measurement may be able to provide a sound theoretical basis for a general and practical method of analysis with which to assess the competing statistical properties of such measures as h , cash flows and net realisable values when these are used in any decision context whatsoever.

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Attributability and Distributability of Profit to Shareholders: A Reply

Robert F. Sharp and Eric E. Spires*

Our paper about profit attributable to shareholders (Sharp and Spires, 1983) has been the focus of some comments by Boussard (1985). The intent of our article was to propose some measurement procedures that are more consistent with the conceptual intent of SSAP 16's profit attributable to shareholders (i.e., the amount that could be distributed while maintaining the shareholders' proportion of the firm's operating capability). We were primarily concerned with the gearing adjustment when gearing varies due to reduction of net borrowing as fixed assets age. The procedures we proposed are logically consistent, they are simpler than SSAP 16, and they accomplish the conceptual objective of SSAP 16 for the situations we analysed.

Boussard (1985) acknowledges this, but he also claims that our procedures are inadequate for two other situations (pp. 274-5):

(i) If depreciation funds are invested at the end of each period, there is a multiplier effect and the level of capital actually maintained in the long run is higher than would be necessary, according to the objective (of SSAP 16).

(ii) The nature of the initial capital to be maintained is also debatable, especially when monetary assets are important.

In this reply, we show that Boussard has not supported these conclusions.

We find that neither problem specifically relates to our proposals. The depreciation multiplier effect is not new and is no more a problem for our procedures than it is for accrual accounting in general. The problem that Boussard illustrates results from his use of an overly narrow definition of operating capability. The second problem results from Boussard's misapplication of our procedures.

Assumptions on the use of depreciation 'funds'

In our original analysis (pp. 56-57), cash not distributed to owners was first used to retire debt and later invested in monetary assets until the depreciable asset was replaced at the end of its useful life. Boussard believes that it is more realistic for a firm to reinvest in operating assets at the end of each accounting period. If a firm does reinvest at the end of each accounting period, Boussard concludes that there is a multiplier effect and:

the proposed measurement procedure is too conservative. A higher profit could be distributed and the initial level of operating capability still maintained. (p. 273)

By referring to our procedure when illustrating the depreciation multiplier effect, and by not stating anything to the contrary, Boussard implies that there is something about the nature of our procedure that causes this phenomenon. Further, by always including price changes and various levels of debt, he complicates his analysis and obscures the multiplier effect. We show below that the phenomenon exists independently of our proposals and in the absence of price changes and debt.

We will use Boussard's assumptions in demonstrating that his problem has nothing to do with our procedures. First, he assumes completely divisible assets; that is, one could buy 30.7% of a car, to use his example (p. 272). Second, Boussard assumes that the services that an asset can produce in each year of its economic life are 100% of the services produced in the first year (p. 272).

Consider a firm that invests at the end of year 0 in a single operating asset that costs 1,000 and has a three-year life. The firm uses straight line depreciation and reinvests each year, in fractional assets, an amount equal to depreciation for the year. There are no price changes and no debt. Table 1 presents the asset portion of the firm's balance sheet in a format similar to that used by Boussard (p. 276).

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Table 1
Illustration of the Depreciation Multiplier Effect

End of Year:	0	1	2	3	4
Asset 1	1,000	1,000	1,000		
Asset 2		333	333	333	
Asset 3			444	444	444
Asset 4				592	592
Asset 5					456
Accumulated depreciation	—	(333)	(777)	(369)	(492)
Total assets	<u>1,000</u>	<u>1,000</u>	<u>1,000</u>	<u>1,000</u>	<u>1,000</u>
Annual capacity*	1.000	1.333	1.777	1.369	1.492
Remaining potential**	3.000	3.000	3.000	3.000	3.000

Notes: *assumes (per Boussard) no decrease in an asset's capacity as it ages.
 **calculated as amount of annual service times the number of periods remaining. For example, the remaining service at the end of year 2 is $(1.000 \times 1) + (0.333 \times 2) + (0.444 \times 3) = 3.000$ (within rounding). As with annual capacity, this assumes no decrease in an asset's capacity as it ages.

Note that the multiplier effect is present (the annual capacity is greater than 1.000 from end of year 1 forward), even though there is no connection with the procedures we proposed in Sharp and Spires (1983). Therefore, it is not our procedures that cause the first problem. (See Brief and Anton, 1987, for a recent review of the depreciation multiplier literature.)

Two concepts of operating capability

The real problem is Boussard's chosen definition of 'operating capability'. To him, operating capability is defined only by service per unit of time (p. 272), which we will refer to as annual capacity. Implicit in our article, however, is a broader concept of operating capability that considers the total service that can be produced during the remaining years of the asset's economic life, which we will refer to as remaining potential. While Boussard refers to remaining potential (p. 272), his analysis ignores it.

Remaining potential can be measured in this context simply by summing the remaining annual capacities, which Boussard assumes are 100% each. This also is presented in Table 1. Note that the remaining potential is constant when funds equal to depreciation are reinvested in fractional assets.

Thus Boussard is really saying that we are mistaken in thinking that accounting should be concerned with remaining service potential, and that, instead, annual capacity is all that matters. This narrow interpretation, however, is at odds with virtually all models of accrual accounting, which implicitly define assets in terms of remaining service potential. Whether using current cost or historical cost accounting, depreciation is charged

as remaining potential is used, even when there is no reduction in annual capacity.

The alternative solution implied by Boussard's definition is unattractive. In the balance sheet, it implies that a used asset is as good as a new asset—as long as the used asset has the same annual capacity. In the income statement, no depreciation would be charged until the asset ceases to function. Then it is not clear whether depreciation would equal the cost of a new asset or the cost of an asset that would provide the same annual capacity for one more year. Either way, the implied alternative would not seem to be very informative.

Non-physical operating capability

Boussard concludes in the second part of his paper that to follow our procedures would not maintain capital properly when monetary assets are important:

As long as the beginning equity is less than the beginning depreciable assets the calculation gives logical results. But when equity is larger than the depreciable assets (i.e., when it corresponds partly to monetary items), the capital maintained can be either overestimated or underestimated. (p. 274)

He demonstrates this with Case Y, which begins the year with the following balances:

Depreciable assets	100
Monetary assets	300
	<u>400</u>
Debt	100
Equity	300
	<u>400</u>

The depreciable asset is new, it has a two-year life, and its price rises 30% during the year. Boussard says, 'the capital [Equity] is maintained at a level of 390' when he applies our procedures. He does not say what level would be right, but 390 is apparently wrong.

The real problem here is that Boussard has misapplied our procedures to a generically different situation. We showed procedures for companies whose monetary investments, if present at all, were incidental to their physical operations. The only monetary asset we considered was accumulated solely for replacement of a depreciable asset, and thus our adjustments were based only on prices of the depreciable asset. In contrast, Boussard's Case Y is a bank or similar operation in which monetary assets are primary.

According to SSAP 16 (paras 12-13), Case Y would call for a monetary working capital adjustment, which we explicitly omitted from our original analysis (p. 55). Had we been trying to show procedures for financial institutions, it is unlikely that we would have ignored the operating nature of their monetary assets (as Boussard did in obtaining his answer of 390).

Our interpretation of SSAP 16 is that maintenance of operating capability in Case Y would depend on whatever prices are relevant to Case Y's

lending operation. If the relevant prices rose 10%, for example, closing equity would presumably have to be 345 to maintain operating capability. Consistent with our original procedures (p. 61), the increased cost of maintaining the shareholders' proportion of both operating assets would be $(300/400)(30 + 30) = 45$. This answer is also consistent with Boussard's Case X, in which a second physical asset's price rose by 10%; so 345 is apparently the right answer.

Again Boussard's criticism is not well supported. His second problem exists only if the procedure we recommend for one situation is used indiscriminantly in a dissimilar situation. When one chooses the procedure that is appropriate for the situation, there seems to be no problem with the procedure or the capital concept on which the procedure is based.

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